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REPORT DOCUMENTATION PAGE

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Dam Safety
National Dam Safety Program
Visual Inspection
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Smith Mill Reservoir
Chautauqua County
Silver Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and visual inspection of Smith Mills Reservoir Dam and appurtenant structures, did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require investigation and remedial action. These areas are as follows:

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The spillway is inadequate for all storms in excess of 1% of the PMF (Probable Maximum Flood). The spillway capacity for analysis purposes is 110 cfs before overtopping of the dam would occur. The PMF was calculated to be 25,300 cfs. The dam is overtopped by 7.4 feet during the 1/2 PMF and 12.7 feet during the PMF.

The ability of the dam to withstand overtopping and the need to provide additional spillway capacity will have to be evaluated. The design and configuaration of the dam is such that only a detailed analysis of the structural stability, which is beyond the scope of this report, will provide sufficient information to determine if overtopping of the dam will be detrimental to the stability of the structure.

Therefore, a detailed structural stability investigation is required to determine the type and extent of required remedial measures. This analysis should be initiated as soon as possible with remedial action, as a result of this investigation, completed within the following year.

The following remedial measures should be completed within 1 year from notification:

1. Monitor bi-weekly the displacement of the cracking at the intersection of the intake tower with the non-overflow section. If movement is ongoing, provide remedial repairs.

2. Monitor at bi-weekly intervals the seepage on the downstream face of the non-overflow section and at the right abutment, at the intake tower intersection, and in the control structure. If significant increases in flow rate are encountered immediately contact the New York State Department of Environmental Conservation Dam Safety Section at (518)457-5557.

3. Recaulk all joints in the spillway and recaulk as required.

4. Monitor the cracked and deteriorated gunite surfaces of the spillway and non-overflow section, and the retaining wall between the spillways. Repair these surfaces as required.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future references. Also, develop an operations manual, and an emergency action plan.

4 LAKE ERIE BASIN

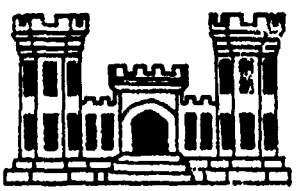
2 SMITH MILLS RESERVOIR DAM

5 CHAUTAUQUA COUNTY, New York.

3 INVENTORY No. NY 786

6 PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM.

Smith Mills Reservoir Dam (Inventory Number NY-786), Lake Erie Basin, Chautauqua County, New York. Phase I Inspection Report,



10/ George /Koch/

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
SMITH MILLS RESERVOIR DAM I.D. No. NY 786
DEC #6D-516 LAKE ERIE BASIN
CHAUTAUQUA COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Smith Mills Reservoir (I.D. No. NY 786)
State Located:	New York
County Located:	Chautauqua
Stream:	Silver Creek (tributary of Lake Erie)
Dates of Inspection:	October 4, November 7 & 8, 1979 and January 2, 198

ASSESSMENT

The examination of documents and visual inspection of Smith Mills Reservoir Dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require investigation and remedial action. These areas are as follows:

The spillway is inadequate for all storms in excess of 1% of the PMF (Probable Maximum Flood). The spillway capacity for analysis purposes is 110 cfs before overtopping of the dam would occur. The PMF was calculated to be 25,300 cfs. The dam is overtopped by 7.4 feet during the 1/2 PMF and 12.7 feet during the PMF.

The ability of the dam to withstand overtopping and the need to provide additional spillway capacity will have to be evaluated. The design and configuration of the dam is such that only a detailed analysis of the structural stability, which is beyond the scope of this report, will provide sufficient information to determine if overtopping of the dam will be detrimental to the stability of the structure.

Therefore, a detailed structural stability investigation is required to determine the type and extent of required remedial measures. This analysis should be initiated as soon as possible with remedial action, as a result of this investigation, completed within the following year.

The following remedial measures should be completed within 1 year from notification:

1. Monitor bi-weekly the displacement of the cracking at the intersection of the intake tower with the non-overflow section. If movement is ongoing, provide remedial repairs.

2. Monitor at bi-weekly intervals the seepage on the downstream face of the non-overflow section and at the right abutment, at the intake tower intersection, and in the control structure. If significant increases in flow rate are encountered immediately contact the New York State Department of Environmental Conservation Dam Safety Section at (518)457-5557.

3. Recaulk all joints in the spillway and recaulk as required.

4. Monitor the cracked and deteriorated gunite surfaces of the spillway and non-overflow section, and the retaining wall between the spillways. Repair these surfaces as required.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future references. Also, develop an operations manual, and an emergency action plan.

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved By:

Col.W. M. Smith Jr.
New York District Engineer

Date: 15 AUG 1980

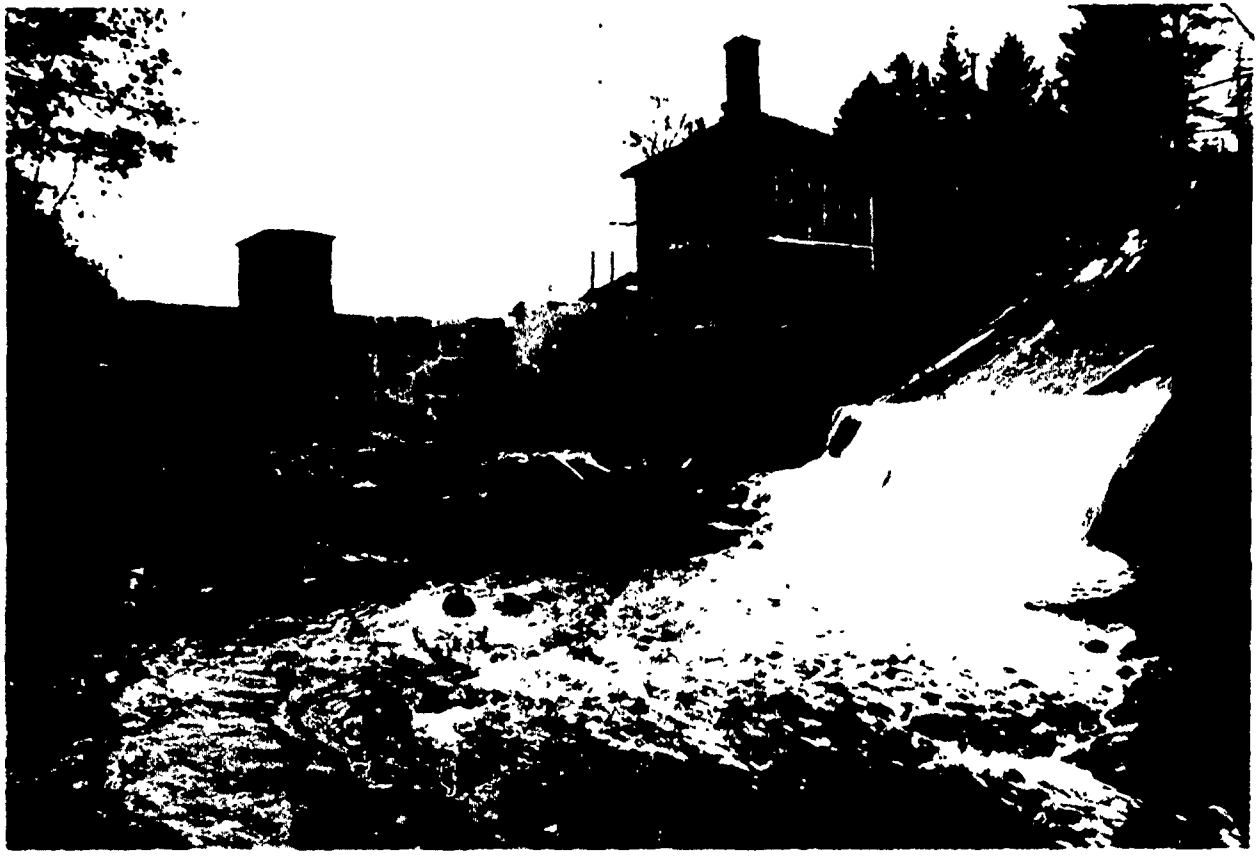

Photo #1
Overview of Smith Mills Reservoir Dam

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
SMITH MILLS RESERVOIR DAM I.D. No. NY 786
DEC # 6D-516 LAKE ERIE BASIN
CHAUTAUQUA COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Smith Mills Reservoir Dam consists of 90 feet long, 19 feet high medium thick arched concrete non-overflow section located at the right abutment of the main spillway and extending across the reservoir. The main spillway is a mass concrete, 59 feet long and 18.5 feet high. This spillway is parallel to the flow of the stream channel and is approximately perpendicular with the non-overflow section. The stream channel runs parallel to the reservoir along its southwest boundry and is divided by a concrete retaining wall. An additional mass concrete gravity section spillway, 27 feet long and 0.1 feet lower than the main spillway, is located north of the main spillway. This spillway is roughly perpendicular to the main spillway. The intervening area between the spillways is divided by a 20 feet long concrete retaining wall and a control structure for the water supply of the Village of Silver Creek. A control tower is also located near the center of the non-overflow section. A 12 inch diameter drain is located on the downstream side of the tower, and 3, 24 inch diameter drains are located at the base of the non-overflow section near the tower. An additional 24 inch drain is located near the crest of the left abutment of the main spillway.

b. Location

The dam is located on Silver Creek approximately 5 miles east of the Village of Silver Creek .

c. Size

The dam is 19 feet high and impounds approximately 50 acre-feet. The dam is classified as "small" in size (less than 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard, because of its location above the Village of Silver Creek.

e. Ownership

The dam is owned and operated by the Village of Silver Creek, Mr. Theodore Welch, Mayor, 172 Central Avenue, Silver Creek, New York 14136, Telephone (716)934-4879. Superintendant of Water & Sewers: Mr. Michael Schober, (716)934-4676.

f. Purpose of the Dam

The dam provides storage for water supply to the Village of Silver Creek, NY.

g. Design and Construction

The dam was built about 1906. No construction of design records are available.

h. Normal Operating Procedures

All flows in excess of the demand for water by the Village of Silver Creek are discharged through the 2 spillways. The demand for water supply is currently provided by a 14 inch pipe from the non-overflow section. A 12 inch diameter pipe from a wet wall near the left abutment of the non-overflow section has been abandoned, but is being considered for rehabilitation.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi)	15.89
b. Elevations (ft./USGS)	
Top of Dam	854.0
Spillway Crest	853.4
Low Level Outlet	
c. Reservoir (acres)	
Surface Area @ Top of Dam	50
Surface Area @ Spillway Crest	27
d. Storage (acre-feet)	
Top of Dam	100
Spillway Crest	50
e. Dam	
Type: Concrete gravity	
Lengths(ft):	90.'
Heights (ft):	19.
f. Spillway:	
Type: 59' concrete ogee section and 27' chute	
Length (ft):	see type
Capacity (cfs):	110.
g. Reservoir Drain	
Type: Four 24" diameter and one 12" diameter cast iron drains.	
Control: Manual, all operational except 12" diameter drain.	
Capacity (cfs):	125.

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

Smith Mills Reservoir Dam is located in the glaciated portion of the Appalachian Uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by the dissection of the uplifted but flat lying sandstones siltstones and shales of the Late Upper Devonian Period (345 to 365 million years ago). The plateau surface is represented by flat-topped divides with drainage generally southward. Drainage within the vicinity of the dam is generally northwestward, due to its location near the Portage Escarpment.

Glacial cover is generally thin, the deposits of which have resulted from glaciations during the Wisconsin glaciation, approximately 11,000 years ago.

2.2 SUBSURFACE INVESTIGATION

No subsurface investigation could be located for the original project. However, bedrock was observed outcropping in the entire downstream channel area and at the abutments of the dam. In addition, the "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are Fremont and Hornell of glacial till origin. These soils are formed on thin glacial till from shale, siltstone and sandstone. These soils are stony silt with some sand and clay. Permeability is generally slow. The depth to bedrock is variable. A subsurface investigation was conducted for the emergency repairs in the spillway apron area and is included in Appendix F.

2.3 EMBANKMENT AND APPURTENANT STRUCTURES

The dam was built about 1906. Limited information could be located concerning the design of the structure. All available information has been included in Appendix F. Repairs to the spillway apron and immediate downstream channel were completed in December 1979. This information, including a current survey of the dam is also included in Appendix F.

The dam consists of a 19 feet high, medium thick arched concrete non-overflow section at the end of the reservoir, abutted by 2 concrete overflow spillway sections at the termination of the adjacent stream channel. Three 24 inch and one 12 inch diameter pipes serve as reservoir drains. A 14 inch and a 12 inch diameter pipe are used to convey water to the control building and a single pipe conveys water to the Village of Silver Creek. The 12 inch pipe is currently inoperative, but may be restored during the rehabilitation of the supply pipe to the Village .

2.4 CONSTRUCTION RECORDS

No construction records are available.

2.5 OPERATION RECORD

All operating records concerning the water supply usage of the facilities are on file with the Superintendant of Water and Sewers.

2.6 EVALUATION OF DATA

The information presented in this report has been compiled from information obtained in part from Mr. Michael Schober (Supt.), Mr. James Nogle (Operator), Mr. Theodore Welch (Mayor), and Urban Engineers Inc. (Francis J. D'Alba). This information appears adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of Smith Mills Reservoir Dam was conducted on October 4, November 7 & 8, 1979 and January 2, 1980. The weather was generally cloudy and the temperature ranged in the thirties. The reservoir level at the time of the inspections varied slightly above the main spillway crest. Sandbags were used to inhibit the main spillway flow and direct it toward the secondary spillway.

b. Spillways

The two concrete spillways located at the end of the side channel (southwest of the reservoir) are in generally good condition. (See Photos #1 thru 7) The gunite covering placed in 1966-7 obscured direct observation of the concrete surface. Gunite at the toe of the main spillway was spalling. Rehabilitation of the 12 inch water supply line which passes through the main spillway should eliminate the rusty seepage observed eminating from the left hole in the spillway (See Photo #4) The intake for the 12 inch line is located at the left abutment of the non-overflow section (See Photo #19) The joints of the auxiliary spillway require recaulking.

c. Non-Overflow Section

The non-overflow section is located at the right abutment of the spillway. (See Photos #1, 2, 20 & 21) A concrete retaining wall beginning at the left abutment of the non-overflow section divides the stream channel from the reservoir (See Photos #6, 7 & 8). The reservoir is retained by the non-overflow section and the spillways retain the stream. A detailed inspection of this section was inhibited by a gunite covering of the entire downstream surface.

The gunite is deteriorated in several locations to the point where the mesh reinforcing is exposed. (See upper part of Photo #15). Seepage was also observed at numerous locations in the gunite covering. (See Photos #1, 2, 9, 10, 12 & 21) This seepage is estimated to be less than 5 gallons per minute over the entire section. The gunite covering was sounded with a hammer and this indicated that the covering was not bonded thoroughtly to the original concrete surface particularly in the vicinity of the observed seepage. Viewed from the top of the dam the gunite is warped and bowed outward.

At the intersection of the brick and concrete intake tower walls with the non-overflow section cracking of the gunite was observed. (See Photos #9 & 10) These cracks extended from the brick downward toward the toe of the structure, with evidence of slight seepage. No immediate cause of this cracking could be determined. Examination of the interior of the intake tower revealed an identical cracking pattern to that on the outside. Seepage was observed emanaling from the exposed rock at the right abutment of the non-overflow section. The seepage rate is estimated to be less than 5 gallons per minute.

d. Spillway Apron

The area immediately below the main spillway is shale bedrock and was originally covered by concrete slabs 8 to 10 inches thick with inverted railroad tracks imbedded in the slabs (See Photos #5 & 22). Presumably these tracks were used to provide additional strength. However, the depth of imbedment is such that very little concrete is present beneath the bottom of the track. The weakness of this method is apparrent in photo #5, where cracking of the slab has developed along the track.

During the storm of September 14, 1979, a portion of the spillway apron and the bedrock foundation was removed by the erosive action of the storm. (See Photos #1 thru 4 and 13 thru 16). Removal of the bedrock was such that the apron immediately below the left side of the spillway was almost completely undermined. The slab on the right side of the spillway was undermined and settled approximately 6 inches. (Photos #5, 13, 14 & 15).

Emergency repair work was in progress by the Village personnel during the second inspection on November 7 & 8, 1979, to remove all loose concrete and shale from the eroded area so that doweled concrete could be installed. Dowels were drilled and grouted into the bedrock, concrete poured around the dowels up to the apron elevation, and grouting of the voids beneath the remaining aprons during December 1979 by Intrusion Prepakt Co. under the direction of Urban Engineers. All work was completed on January 4, 1980. A subsurface investigation and detailed description of the work is included in Appendix F. The completed repair work can be identified in Photos #21 and 22, taken during the third inspection on January 2, 1980.

e. Downstream Channel

The downstream channel below the dam is bedrock controlled and has experienced little damage from the September 14, 1979 storm. Erosion and flooding in the channel near and in the Village of Silver Creek was reported after the storm. These problems were indicated by Village officials to occur yearly.

f. Regulating Outlets

Three 24 inch diameter conduits through the non-overflow section serve as a reservoir drain. (See Photo #12) An 8 inch cast iron pipe serves as a drain for the intake structure. A 10 inch drain serves as a drain for the 12 inch diameter water supply intake. All drains are reported operational, except for the 10 inch drain at the left abutment of the non-overflow section.

A 24 inch diameter concrete conduit located at the left abutment of the main spillway is unregulated. (See Photo #11) This conduit is used to provide discharge during low flow conditions.

g. Appurtenant Structures

The retaining wall between the spillways has several hairline cracks which may be related to shrinkage or thermal considerations.

The control structure located near the toe of the dam, between the spillways is generally in good condition. Several cracks were observed in the walls of the structure near the foundation. (See Photo #17) These cracks are related to the removal of a section of the wall for installation of the 14 inch diameter water supply line.

Seepage was observed in the upstream wall of the control structure near the foundation. This seepage estimated to be less than 2 gallons per minute was observed eminating from the shale bedrock. (See Photo #18) Additional seepage was observed at the entrance of the 14 inch diameter water supply to the control structure. This seepage is estimated to be less than 1 gallon per minute. Seepage within this structure is not considered significant at this time.

h. Reservoir Area

The side slopes of the reservoir area are generally steep and susceptable to erosion of the bedrock controlled slopes. The reservoir area was dredged in 1979 with the use of a Mud Cat to the contract limits specified by McFarland-Johnson Gibbons Engineers.

3.2 EVALUATION OF OBSERVATIONS

The problem areas observed during the inspections and the remedial actions or investigations required are listed below in order of importance:

1. Cracking of the walls of the intake tower adjacent to the non-overflow section was observed. Provide a program of periodic inspection and measurement of the cracks at bi-weekly intervals to determine if ongoing movement and seepage is occurring.

2. Seepage was evident on the downstream face of the non-overflow section and at the right abutment at the intersection of the intake tower with the non-overflow section, and in the control structure. These areas should be monitored at bi-weekly intervals, with the aid of weirs or other flow measuring devices.

3. The joints in the spillway require recaulking.

4. The gunite surfaces of the spillway and non-overflow sections are cracked and deteriorated. The retaining wall between the spillway is cracked. Repair these surfaces as required.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future reference. Also develop an operations manual, and an emergency action plan.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface is approximated by the crest of the spillways. The reservoir surface may be lower due to the demand for water by the Village of Silver Creek. This demand is currently supplied by a 14 inch diameter pipe from the intake tower, at the downstream face of the non-overflow section, beneath the main spillway to the control structure, and then to the Village.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the Village of Silver Creek. Maintenance of the dam is generally considered satisfactory.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

Operation and Maintenance of the dam is considered satisfactory. The timely remedial repairs of the eroded area below the spillway, the intended restoration of the 12 inch diameter line, and removal of sediment within the reservoir are indicative of proper operation and maintenance procedures.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

Smith's Mills Dam is located on Silver Creek in the Village of Smith Mills, township of Hanover, Chautauqua County. The total drainage area is 15.9 square miles. It was divided into an upper and lower sub-basin split by an upstream storage facility, Silver Creek Reservoir. The topography is of generally moderate to mild slope being well drained with many drainage paths.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer model, incorporating the "Snyder Synthetic Unit Hydrograph" method, and the "Modified Puls" flood routing procedure. The floods selected for analysis was the PMF and 1/2 PMF in accordance with the recommended guidelines of the Corps of Engineers.

5.3 SPILLWAY CAPACITY

The Smith's Mills spillway, has two components, a primary overflow ogee section of 59' in length and a chute spillway 27' in length with an '0.1' lower crest elevation. The spillways have a capacity of 110 cfs at top of dam which is less than 1% of the PMF of 25300 cfs. The dam is overtopped by 7.4' during 1/2 the PMF and 12.7' during the PMF event.

5.4 RESERVOIR CAPACITY

Capacity to normal water elevation is approximately 50 acre feet. Surcharge storage to top of dam is an additional 50 acre feet, creating a total storage to top of dam of 100 acre feet. The surcharge storage above spillway crest elevation is equivalent to .06" runoff.

5.5 FLOODS OF RECORD

There are no recorded events particular to the Smith's Mills dam but the dam was reportedly overtopped by approximately 3 feet during the flood of September 14, 1979. The estimated discharge at this time would be 3050 cfs.

5.6 OVERTOPPING POTENTIAL

The PMF analysis indicates the dam will be overtopped by 12.7' during the PMF, and 7.4' during the 1/2 PMF. Much flooding would occur in either case due to the low lying areas on both sides of King Road.

5.7 EVALUATION

The spillway is inadequate to pass any flow in excess of 1% of the PMF.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Seepage through the non-overflow section, cracking at the intersection of the intake tower and the non-overflow section and the erosion at the toe of the spillway (which has been repaired) were observed during the inspection. These Areas are indicative of problems which require investigation and remedial measures.

b. Design and Construction Data

No information could be located concerning the structural stability of the dam.

6.2 STABILITY ANALYSIS

The design of the structure is such that only a thorough detailed analysis of the dam will provide meaningful results. This type of analysis is beyond the scope of this report. Therefore, it is recommended that the owner engage the services of a professional engineer to investigate the structural stability of the dam.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of Smith Mills Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. The complexity of the dam configuration necessitates an in-depth structural stability analysis. If unacceptable factors of safety are achieved, the dam may be considered to have a "seriously inadequate" spillway. This determination cannot be made until completion of the stability analysis.

b. Adequacy of Information

Information reviewed for the purposes of the Phase I Inspection Report is considered adequate.

c. Urgency

The structural stability investigation should be initiated as soon as possible and completed within 6 months of notification. Remedial measures and any action as a result of this investigation should be completed within 1 year of notification.

d. Need for Additional Investigation

A structural stability investigation is required to determine if the spillways and non-overflow sections are structurally stable under all loading conditions.

7.2 RECOMMENDED MEASURES

1. The results of the structural stability investigation will determine the type and extent of remedial measures required.

2. At bi-weekly intervals monitor, the seepage and accurately measure the displacement of the cracking which has occurred at the intersection of the intake tower with the non-overflow section, to determine if ongoing movement and seepage is occurring. Provide remedial repairs as a result of this work.

3. Monitor at bi-weekly intervals the seepage on the downstream face of the non-overflow section and at the right abutment, at the intake tower intersection, and in the control structure.

4. Recaulk the joints in the spillway and recaulk as necessary.

5. Monitor the cracked and deteriorated gunite surfaces of the spillway and non-overflow section, and the retaining wall between the spillways. Repair these surfaces as required.

6. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all gates and valves. Document this information for future reference. Also develop an operations manual, and an emergency action plan.

APPENDIX A

PHOTOGRAPHS

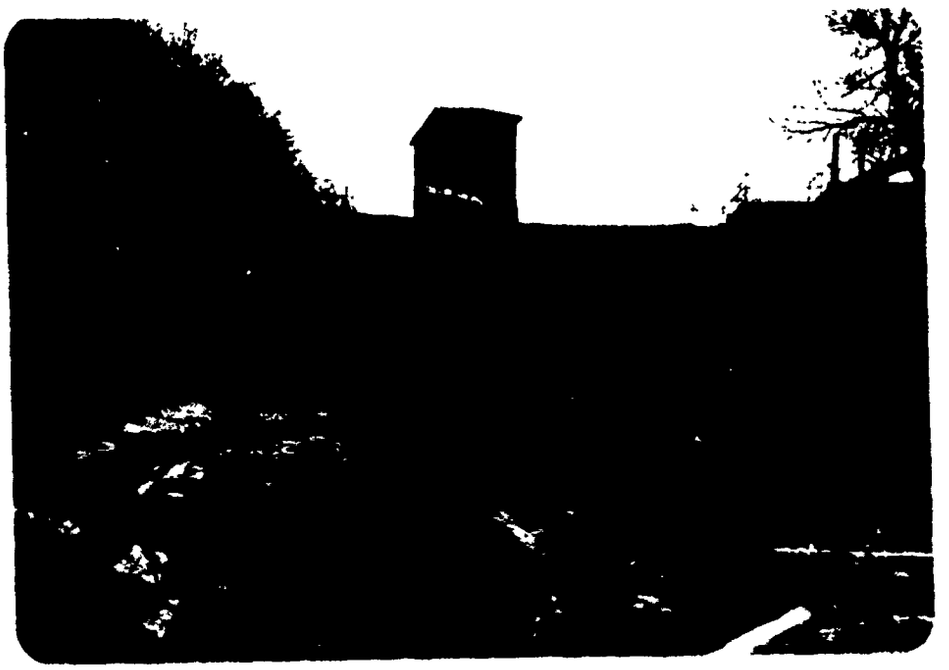

Photo #2
Non-Overflow Section

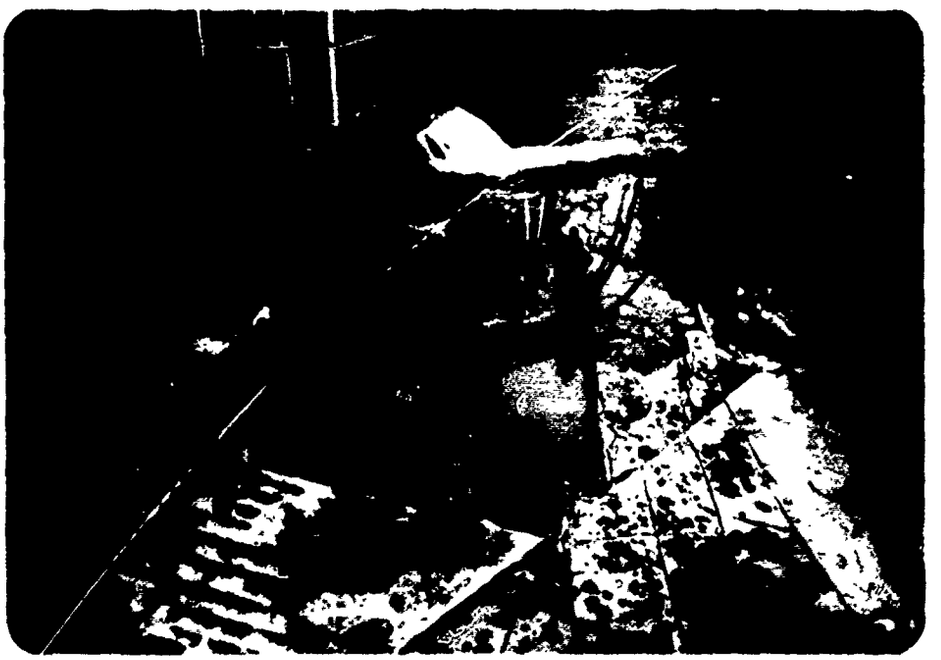

Photo #3
Erosion of Shale Bedrock below spillways

Photo #4
Control Structure
Note debris from apron area

Photo #5
Spillway Apron
(note cracking along R.R. track)

Photo #6
Spillways-Upstream Face

Photo #7
Reservoir (left) Silver Creek (right)

Photo #8
Retaining wall between reservoir & creek

Photo #9
Right side of Intake tower

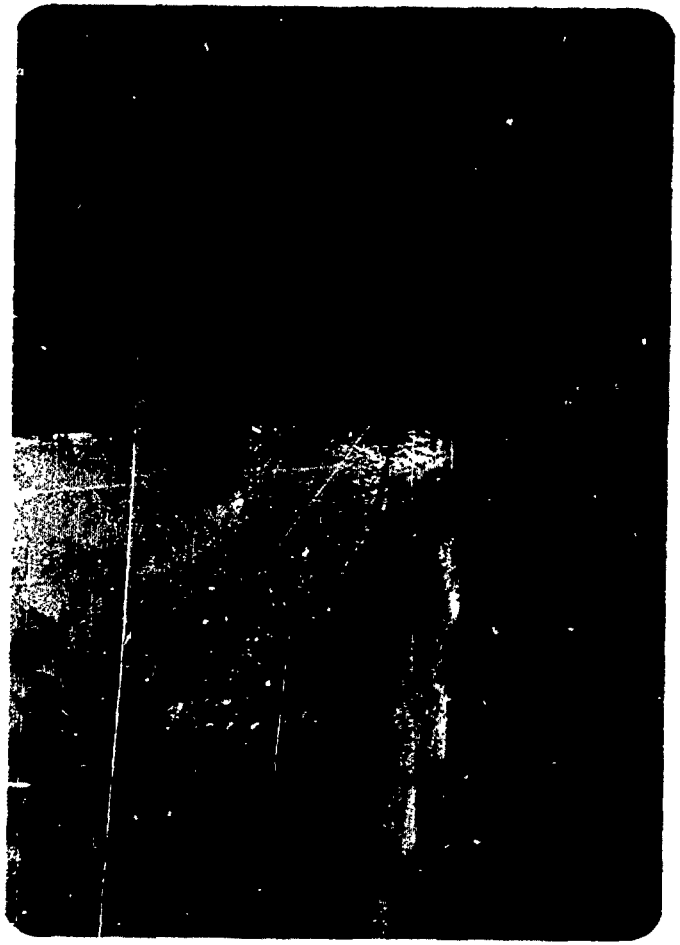

Photo #10
Left side of Intake tower

Photo #11
Drain at left of Spillway

Photo #12
Reservoir Drain (non-overflow section)

Photo #13
Eroded Area at base of spillway

Photo #14
Eroded Area (note settlement of Apron)

Photo #15
Eroded Area

Photo #16
Eroded Area (adjacent to control structure)

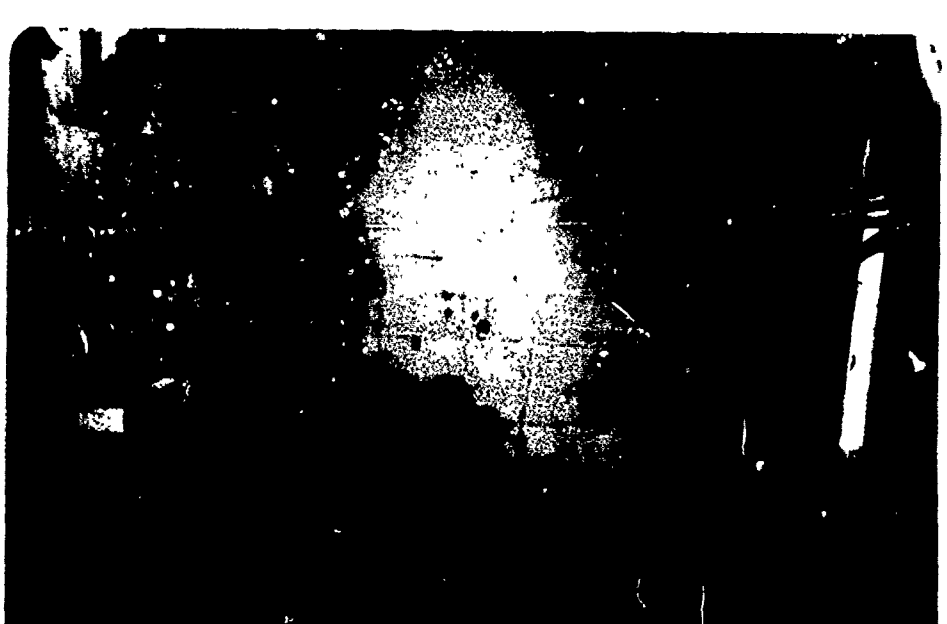

Photo #17
Control Structure at inlet of 14" supply line

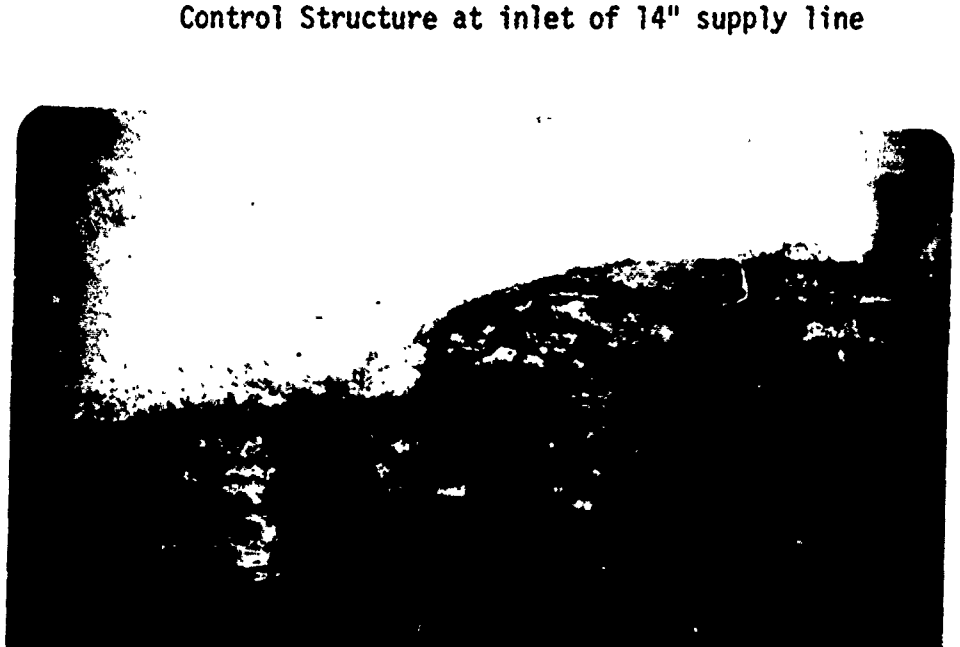

Photo #18
Seepage in bedrock - upstream face of control structure

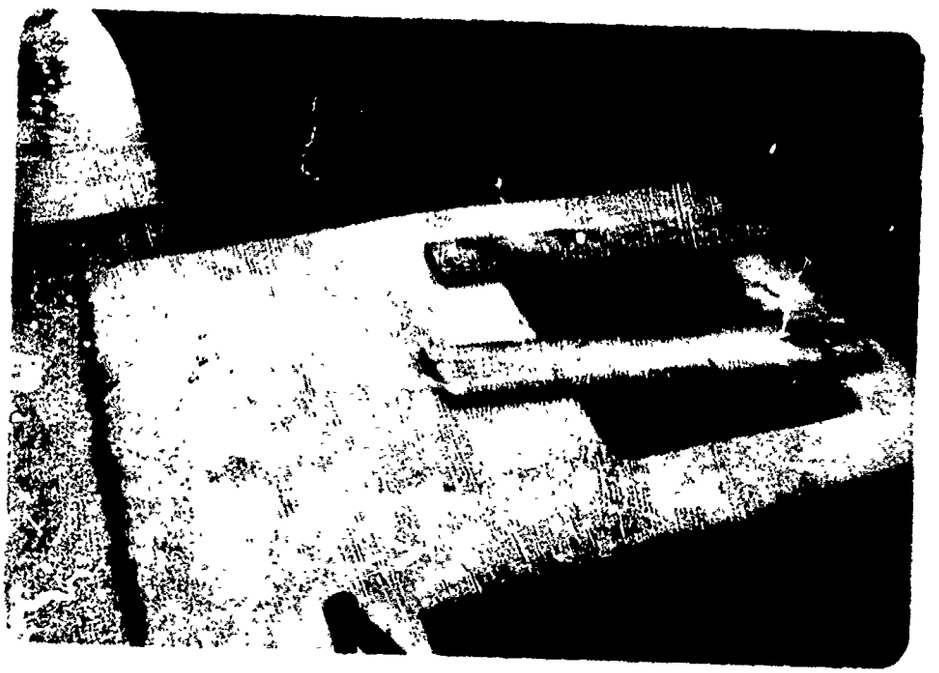

Photo #19
Intake of 12" supply line

Photo #20
Upstream face of Non-overflow section

Photo #21
Spillway Apron after repairs (1/2/80)

Photo #22
Spillway Apron after repairs (1/2/80)

APPENDIX B

ENGINEERING DATA CHECKLIST

Check List
Engineering Data
Design Construction Operation

Name of Dam _____

I.D. # _____

Item	Remarks		
	Plans	Details	Typical Sections
Dam			
Spillway(s)			
Outlet(s)			
Design Reports			
Design Computations			
Discharge Rating Curves			
Dam Stability			
Seepage Studies			
Subsurface and Materials Investigations			

Item	Remarks
Construction History	
Surveys, Modifications, Post-Construction Engineering Studies and Reports	
Accidents or Failure of Dam Description, Reports	
Operation and Maintenance Records Operation Manual	

APPENDIX C

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam _____

Fed. I.D. # _____ DEC Dam No. _____

River Basin _____

Location: Town _____ County _____

Stream Name _____

Tributary of _____

Latitude (N) _____ Longitude (W) _____

Type of Dam _____

Hazard Category _____

Date(s) of Inspection _____

Weather Conditions _____

Reservoir Level at Time of Inspection _____

b. Inspection Personnel _____

_____

c. Persons Contacted (Including Address & Phone No.) _____

_____

_____

_____

_____

d. History:

Date Constructed _____ Date(s) Reconstructed _____

_____

Designer _____

Constructed By _____

Owner _____

2) Embankment

a. Characteristics

(1) Embankment Material _____

_____

(2) Cutoff Type _____

_____

(3) Impervious Core _____

_____

(4) Internal Drainage System _____

_____

(5) Miscellaneous _____

_____

b. Crest

(1) Vertical Alignment _____

_____

(2) Horizontal Alignment _____

_____

(3) Surface Cracks _____

_____

(4) Miscellaneous _____

_____

c. Upstream Slope

(1) Slope (Estimate) (V:H) _____

(2) Undesirable Growth or Debris, Animal Burrows _____

_____

(3) Sloughing, Subsidence or Depressions _____

_____

_____

(4) Slope Protection _____

_____

_____

(5) Surface Cracks or Movement at . e _____

_____

d. Downstream Slope

(1) Slope (Estimate - V:H) _____

(2) Undesirable Growth or Debris, Animal Burrows _____

_____

(3) Sloughing, Subsidence or Depressions _____

_____

_____

(4) Surface Cracks or Movement at Toe _____

_____

(5) Seepage _____

_____

_____

(6) External Drainage System (Ditches, Trenches; Blanket) _____

_____

_____

(7) Condition Around Outlet Structure _____

_____

(8) Seepage Beyond Toe _____

_____

e. Abutments - Embankment Contact

_____

_____

(1) Erosion at Contact _____

_____

(2) Seepage Along Contact _____

_____

_____

_____

3) Drainage System

a. Description of System _____

_____

_____

_____

b. Condition of System _____

_____

c. Discharge from Drainage System _____

_____

_____

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)_____

_____

_____

_____

_____

_____

_____

_____

_____

5) Reservoir

a. Slopes _____

_____

b. Sedimentation _____

_____

c. Unusual Conditions Which Affect Dam _____

_____

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) _____

_____

b. Seepage, Unusual Growth _____

_____

c. Evidence of Movement Beyond Toe of Dam _____

_____

d. Condition of Downstream Channel _____

_____

7) Spillway(s) (Including Discharge Conveyance Channel)

_____

_____

a. General _____

_____

_____

_____

b. Condition of Service Spillway _____

_____

_____

_____

_____

_____

c. Condition of Auxiliary Spillway _____

_____

_____

_____

_____

d. Condition of Discharge Conveyance Channel _____

_____

_____

_____

_____

8) Reservoir Drain/Outlet

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

_____

Hydraulic Capability: _____

_____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

_____

9) Structural

a. Concrete Surfaces _____

b. Structural Cracking _____

c. Movement - Horizontal & Vertical Alignment (Settlement) _____

d. Junctions with Abutments or Embankments _____

e. Drains - Foundation, Joint, Face _____

f. Water Passages, Conduits, Sluices _____

g. Seepage or Leakage _____

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates _____

l. Approach & Outlet Channels _____

m. Energy Dissipators (Plunge Pool, etc.) _____

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition _____

APPENDIX D

HYDROLOGIC/HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

SMITH'S MILLS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	858.4	≈ 50.	≈ 100.
2) Design High Water (Max. Design Pool)	—	—	—
3) Auxiliary Spillway Crest	853.5	≈ 30.	≈ 55.
4) Pool Level with Flashboards	—	—	—
5) Service Spillway Crest	853.4	27.	50.

DISCHARGES

	Volume (cfs)
1) Average Daily	≈ 20 cfs.
2) Spillway @ Maximum High Water	110.
3) Spillway @ Design High Water	—
4) Spillway @ Auxiliary Spillway Crest Elevation	2.5
5) Low Level Outlet	125 cfs
6) Total (of all facilities) @ Maximum High Water	
7) Maximum Known Flood	235.
8) At Time of Inspection	10 cfs

CREST: ELEVATION: 853.4

Type: Concrete (OGEE) overflow section

Width: _____ Length: 59.'

Spillover _____

Location center of DAM

SPILLWAY:

PRINCIPAL		EMERGENCY
853.4	Elevation	853.5
Concrete ogee	Type	Concrete chute
59'	Width	27'

Type of Control

_____	Uncontrolled	_____
	Controlled:	
_____	Type (Flashboards; gate)	_____
_____	Number	_____
_____	Size/Length	_____
	Invert Material	_____
	Anticipated Length of operating service	_____
_____	Chute Length	_____
10'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	.10'

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: —

Records:

Date - —

Max. Reading - —

FLOOD WATER CONTROL SYSTEM:

Warning System: —

Method of Controlled Releases (mechanisms):

—

DRAINAGE AREA: 15.9 Mi.²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Rural

Terrain - Relief: moderate relief

Surface - Soil: glacial till, well drained

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

—

Potential Sedimentation problem areas (natural or man-made; present or future)

—

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

—

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: —

Elevation: —

Reservoir:

Length @ Maximum Pool .2 (Miles)

Length of Shoreline (@ Spillway Crest) .45 (Miles)

```
**********                                                    **********
FLOOD HYDROGRAPH PACKAGE (HEC-1)                              NEW YORK STATE
DAM SAFETY VERSION     JULY 1978                              DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                                FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL APR 79
**********                                                    **********
```

```
    1              A1  INFLOW-OUTFLOW SILVER RES.
    2              A2  SUB-BASIN OF SMITH MILLS RES.
    3              A3  31 MAR 1980
    4              B     200       0      30       0       0       0       0       0       0       0
    5              B1      5
    6              J       1       2       1
    7              J1    .5       1
    8              K       0       1                                                       1
    9              K1  INFLOW TO SILVER CR. RES.
   10              M       1       1    4.47              15.69                                      1
   11              P       0    22.5     107     120     130     139
   12              T                                                                  1.0     0.1
   13              W    3.54   0.625
   14              X    -2.      2.       1
   15              K       1       1                                                       1
   16              K1  ROUTED HYDROGRAPH AT SILVER CR. RES.
   17              Y                                       1       1
   18              Y1      1                                                          -1155      -1
   19              Y4   1155    1157    1160  1161.5
   20              Y5      0     730    2850    4280
   21              $S      0   220.5   475.5    1192
   22              $E   1125    1155    1160    1170
   23              $$   1155
   24              $D1161.5     2.9     1.5    1500
   25              K       0       2                                                       1
   26              K1  INFLOW TO SMITH MILLS RES. FROM LOWER SUBBASIN
   27              M       1       1   11.42              15.89
   28              P       0    22.5     107     120     130     139
   29              T                                                                  1.0     0.1
   30              W    4.52   0.625
   31              Y      -2       2       1
```

```
32              K       2       3
33              K       1       3                                                       1
34              K1  ROUTE TOTAL BASIN RUNOFF THROUGH SMITH MILLS.
35              Y                                       1       1
36              Y1      1                                                       -853,5      -1
37              Y4  853,4   853,5   854,0   855,0   857,0   859,0
38              Y5      0     2,5   110,0   550,0  1927,0  3778,0
39              $S      0     ,63    2,67   10,14   22,52   50,02
40              $E    842     844     846     848     850     854
41              $$  853,6
42              $D  854,0     3,2     1,5     100
43              K      99
44              A
45              A
46              A
47              A
48              A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	1
RUNOFF HYDROGRAPH AT	2
COMBINE 2 HYDROGRAPHS AT	3
ROUTE HYDROGRAPH TO	3
END OF NETWORK	

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********

RUN  DATE 03/31/80

                                                    **********
                                                    NEW YORK STATE
                                                    DEPT OF ENVIRONMENTAL CONSERVATION
                                                    FLOOD PROTECTION BUREAU
                                                    **********

                    INFLOW-OUTFLOW SILVER RES.
                    SUB-BASIN OF SMITH MILLS RES.
                    31 MAR 1980

                                JOB SPECIFICATION
      NO      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
     200       0       30        0       0        0        0        0        0        0
                                JOPER      NWT    LROPT    TRACE
                                    5        0        0        0

                        MULTI-PLAN ANALYSES TO BE PERFORMED
                            NPLAN= 1 NRTIO= 2 LRTIO= 1
                    RTIOS=   0.50    1.00

**********          **********          **********          **********          **********

                        SUB-AREA RUNOFF COMPUTATION

                INFLOW TO SILVER CR. RES.
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE  IAUTO
                         1       0       0       0       0       0       1       0       0

                                HYDROGRAPH DATA
            IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW  ISAME  LOCAL
                1       1    4.47      0.   15.89      0.      0.      0      1      0

                                PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.   22.50  107.00  120.00  130.00  139.00      0.      0.
TRSPC COMPUTED BY THE PROGRAM IS 0.816

                                LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0      0.      0.    1.00      0.      0.    1.00    1.00    0.10      0.      0.

                            UNIT HYDROGRAPH DATA
                        TP=  3.54    CP=0.63    NTA=  0

                                RECESSION DATA
                        STRTQ=   -2.00    QRCSN=    2.00    RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 7.95 AND R= 6.36 INTERVALS

            UNIT HYDROGRAPH 38 END-OF-PERIOD ORDINATES, LAG=  3.51 HOURS, CP= 0.63  VOL= 1.00
    27.     98.    195.    304.    408.    484.    523.    519.    468.    400.
   341.    292.    249.    213.    182.    155.    133.    113.     97.     83.
    71.     60.     52.     44.     38.     32.     27.     23.     20.     17.
    15.     12.     11.      9.      8.      7.      6.      5.

                            END-OF-PERIOD
```

1.01	2.00	4	0.00	0.	0.00	9.	1.03	4.00	104	0.	0.	0.	798.
1.01	2.30	5	0.00	0.	0.00	9.	1.03	4.30	105	0.	0.	0.	683.
1.01	3.00	6	0.00	0.	0.00	9.	1.03	5.00	106	0.	0.	0.	584.
1.01	3.30	7	0.00	0.	0.00	9.	1.03	5.30	107	0.	0.	0.	499.
1.01	4.00	8	0.00	0.	0.00	9.	1.03	6.00	108	0.	0.	0.	427.
1.01	4.30	9	0.00	0.	0.00	9.	1.03	6.30	109	0.	0.	0.	366.
1.01	5.00	10	0.00	0.	0.00	9.	1.03	7.00	110	0.	0.	0.	313.
1.01	5.30	11	0.00	0.	0.00	9.	1.03	7.30	111	0.	0.	0.	265.
1.01	6.00	12	0.00	0.	0.00	9.	1.03	8.00	112	0.	0.	0.	224.
1.01	6.30	13	0.01	0.	0.01	9.	1.03	8.30	113	0.	0.	0.	188.
1.01	7.00	14	0.01	0.	0.01	9.	1.03	9.00	114	0.	0.	0.	157.
1.01	7.30	15	0.01	0.	0.01	9.	1.03	9.30	115	0.	0.	0.	130.
1.01	8.00	16	0.01	0.	0.01	9.	1.03	10.00	116	0.	0.	0.	106.
1.01	8.30	17	0.01	0.	0.01	9.	1.03	10.30	117	0.	0.	0.	85.
1.01	9.00	18	0.01	0.	0.01	9.	1.03	11.00	118	0.	0.	0.	68.
1.01	9.30	19	0.01	0.	0.01	9.	1.03	11.30	119	0.	0.	0.	54.
1.01	10.00	20	0.01	0.	0.01	9.	1.03	12.00	120	0.	0.	0.	43.
1.01	10.30	21	0.01	0.	0.01	9.	1.03	12.30	121	0.	0.	0.	34.
1.01	11.00	22	0.01	0.	0.01	9.	1.03	13.00	122	0.	0.	0.	27.
1.01	11.30	23	0.01	0.	0.01	9.	1.03	13.30	123	0.	0.	0.	22.
1.01	12.00	24	0.01	0.	0.01	9.	1.03	14.00	124	0.	0.	0.	18.
1.01	12.30	25	0.07	0.	0.07	9.	1.03	14.30	125	0.	0.	0.	15.
1.01	13.00	26	0.07	0.	0.07	9.	1.03	15.00	126	0.	0.	0.	13.
1.01	13.30	27	0.08	0.	0.08	9.	1.03	15.30	127	0.	0.	0.	12.
1.01	14.00	28	0.08	0.	0.08	9.	1.03	16.00	128	0.	0.	0.	11.
1.01	14.30	29	0.10	0.	0.10	9.	1.03	16.30	129	0.	0.	0.	10.
1.01	15.00	30	0.10	0.	0.10	9.	1.03	17.00	130	0.	0.	0.	10.
1.01	15.30	31	0.12	0.	0.12	9.	1.03	17.30	131	0.	0.	0.	10.
1.01	16.00	32	0.39	0.21	0.19	14.	1.03	18.00	132	0.	0.	0.	9.
1.01	16.30	33	0.10	0.05	0.05	30.	1.03	18.30	133	0.	0.	0.	9.
1.01	17.00	34	0.10	0.05	0.05	55.	1.03	19.00	134	0.	0.	0.	9.
1.01	17.30	35	0.07	0.02	0.05	85.	1.03	19.30	135	0.	0.	0.	9.
1.01	18.00	36	0.07	0.02	0.05	118.	1.03	20.00	136	0.	0.	0.	9.
1.01	18.30	37	0.01	0.	0.01	148.	1.03	20.30	137	0.	0.	0.	9.
1.01	19.00	38	0.01	0.	0.01	169.	1.03	21.00	138	0.	0.	0.	9.
1.01	19.30	39	0.01	0.	0.01	179.	1.03	21.30	139	0.	0.	0.	9.
1.01	20.00	40	0.01	0.	0.01	174.	1.03	22.00	140	0.	0.	0.	9.
1.01	20.30	41	0.01	0.	0.01	161.	1.03	22.30	141	0.	0.	0.	9.
1.01	21.00	42	0.01	0.	0.01	144.	1.03	23.00	142	0.	0.	0.	9.
1.01	21.30	43	0.01	0.	0.01	127.	1.03	23.30	143	0.	0.	0.	9.
1.01	22.00	44	0.01	0.	0.01	110.	1.04	0.	144	0.	0.	0.	9.
1.01	22.30	45	0.01	0.	0.01	96.	1.04	0.30	145	0.	0.	0.	9.
1.01	23.00	46	0.01	0.	0.01	83.	1.04	1.00	146	0.	0.	0.	9.
1.01	23.30	47	0.01	0.	0.01	72.	1.04	1.30	147	0.	0.	0.	9.
1.02	0.	48	0.01	0.	0.01	63.	1.04	2.00	148	0.	0.	0.	9.
1.02	0.30	49	0.06	0.01	0.05	55.	1.04	2.30	149	0.	0.	0.	9.
1.02	1.00	50	0.06	0.01	0.05	50.	1.04	3.00	150	0.	0.	0.	9.
1.02	1.30	51	0.06	0.01	0.05	46.	1.04	3.30	151	0.	0.	0.	9.
1.02	2.00	52	0.06	0.01	0.05	45.	1.04	4.00	152	0.	0.	0.	9.
1.02	2.30	53	0.06	0.01	0.05	45.	1.04	4.30	153	0.	0.	0.	9.
1.02	3.00	54	0.06	0.01	0.05	47.	1.04	5.00	154	0.	0.	0.	9.
1.02	3.30	55	0.06	0.01	0.05	50.	1.04	5.30	155	0.	0.	0.	9.
1.02	4.00	56	0.06	0.01	0.05	53.	1.04	6.00	156	0.	0.	0.	9.
1.02	4.30	57	0.06	0.01	0.05	56.	1.04	6.30	157	0.	0.	0.	9.
1.02	5.00	58	0.06	0.01	0.05	58.	1.04	7.00	158	0.	0.	0.	9.
1.02	5.30	59	0.06	0.01	0.05	61.	1.04	7.30	159	0.	0.	0.	9.
1.02	6.00	60	0.06	0.01	0.05	62.	1.04	8.00	160	0.	0.	0.	9.
1.02	6.30	61	0.20	0.15	0.05	68.	1.04	8.30	161	0.	0.	0.	9.
1.02	7.00	62	0.20	0.15	0.05	83.	1.04	9.00	162	0.	0.	0.	9.
1.02	7.30	63	0.20	0.15	0.05	110.	1.04	9.30	163	0.	0.	0.	9.
1.02	8.00	64	0.20	0.15	0.05	153.	1.04	10.00	164	0.	0.	0.	9.
1.02	8.30	65	0.20	0.15	0.05	210.	1.04	10.30	165	0.	0.	0.	9.
1.02	9.00	66	0.20	0.15	0.05	278.	1.04	11.00	166	0.	0.	0.	9.
1.02	9.30	67	0.20	0.15	0.05	350.	1.04	11.30	167	0.	0.	0.	9.
1.02	10.00	68	0.20	0.15	0.05	422.	1.04	12.00	168	0.	0.	0.	9.

1.02	10.30	69	0.20	0.15	0.05	417.	1.04	12.30	170	0.	0.	0.	9.
1.02	11.00	70	0.20	0.15	0.05	542.	1.04	13.00	170	0.	0.	0.	9.
1.02	11.30	71	0.20	0.15	0.05	589.	1.04	13.30	171	0.	0.	0.	9.
1.02	12.00	72	0.20	0.15	0.05	629.	1.04	14.00	172	0.	0.	0.	9.
1.02	12.30	73	0.94	0.93	0.05	685.	1.04	14.30	173	0.	0.	0.	9.
1.02	13.00	74	0.93	0.93	0.05	791.	1.04	15.00	174	0.	0.	0.	9.
1.02	13.30	75	1.18	1.13	0.05	974.	1.04	15.30	175	0.	0.	0.	9.
1.02	14.00	76	1.18	1.13	0.05	1252.	1.04	16.00	176	0.	0.	0.	9.
1.02	14.30	77	1.47	1.42	0.05	1636.	1.04	16.30	177	0.	0.	0.	9.
1.02	15.00	78	1.47	1.42	0.05	2119.	1.04	17.00	178	0.	0.	0.	9.
1.02	15.30	79	1.79	1.74	0.05	2686.	1.04	17.30	179	0.	0.	0.	9.
1.02	16.00	80	5.67	5.62	0.05	3425.	1.04	18.00	180	0.	0.	0.	9.
1.02	16.30	81	1.37	1.32	0.05	4351.	1.04	18.30	181	0.	0.	0.	9.
1.02	17.00	82	1.37	1.32	0.05	5349.	1.04	19.00	182	0.	0.	0.	9.
1.02	17.30	83	1.08	1.03	0.05	6333.	1.04	19.30	183	0.	0.	0.	9.
1.02	18.00	84	1.08	1.03	0.05	7201.	1.04	20.00	184	0.	0.	0.	9.
1.02	18.30	85	0.09	0.04	0.05	7816.	1.04	20.30	185	0.	0.	0.	9.
1.02	19.00	86	0.09	0.04	0.05	8092.	1.04	21.00	186	0.	0.	0.	9.
1.02	19.30	87	0.09	0.04	0.05	7990.	1.04	21.30	187	0.	0.	0.	9.
1.02	20.00	88	0.09	0.04	0.05	7512.	1.04	22.00	188	0.	0.	0.	9.
1.02	20.30	89	0.09	0.04	0.05	6820.	1.04	22.30	189	0.	0.	0.	9.
1.02	21.00	90	0.09	0.04	0.05	6074.	1.04	23.00	190	0.	0.	0.	9.
1.02	21.30	91	0.09	0.04	0.05	5320.	1.04	23.30	191	0.	0.	0.	9.
1.02	22.00	92	0.09	0.04	0.05	4605.	1.05	0.	192	0.	0.	0.	9.
1.02	22.30	93	0.09	0.04	0.05	3970.	1.05	0.30	193	0.	0.	0.	9.
1.02	23.00	94	0.09	0.04	0.05	3428.	1.05	1.00	194	0.	0.	0.	9.
1.02	23.30	95	0.09	0.04	0.05	2965.	1.05	1.30	195	0.	0.	0.	9.
1.03	0.	96	0.09	0.04	0.05	2569.	1.05	2.00	196	0.	0.	0.	9.
1.03	0.30	97	0.	0.	0.	2230.	1.05	2.30	197	0.	0.	0.	9.
1.03	1.00	98	0.	0.	0.	1937.	1.05	3.00	198	0.	0.	0.	9.
1.03	1.30	99	0.	0.	0.	1682.	1.05	3.30	199	0.	0.	0.	9.
1.03	2.00	100	0.	0.	0.	1458.	1.05	4.00	200	0.	0.	0.	9.

SUM 25.51 21.81 .71 128912.
(648.)(554.)(18.)(3593.75)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8092.	6439.	2546.	878.	128956.
CMS	229.	182.	72.	25.	3653.
INCHES		13.40	21.19	21.92	22.01
MM		340.38	538.30	556.80	558.97
AC-FT		3193.	5050.	5223.	5244.
THOUS CU M		3939.	6230.	6443.	6468.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	7.	15.	27.	43.	59.	74.	85.	89.	87.
80.	72.	63.	55.	48.	41.	36.	31.	28.	25.
23.	22.	23.	23.	25.	26.	28.	29.	30.	31.
34.	41.	55.	77.	105.	139.	175.	211.	244.	271.
294.	315.	342.	395.	487.	626.	818.	1060.	1344.	1712.
2175.	2675.	3166.	3600.	3908.	4046.	3995.	3756.	3410.	3037.
2660.	2303.	1985.	1714.	1482.	1285.	1115.	969.	841.	729.
630.	543.	466.	399.	341.	292.	250.	214.	183.	157.
132.	112.	94.	78.	65.	53.	42.	25.	15.	14.
11.	8.	7.	7.	6.	6.	6.	5.	5.	5.
5.	5.	5.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4046.	3220.	127[illegible].	439.	6344[illegible].
CMS	115.	91.	[illegible].	12.	1797.
INCHES		6.70	1[illegible]	15.96	11.[illegible]
MM		170.19	269.[illegible]	278.40	279.[illegible]
AC-FT		1597.	25[illegible].	2612.	2622.
THOUS CU M		1969.	3114.	3221.	3234.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	14.	30.	55.	85.	116.	148.	169.	179.	174.
161.	144.	127.	110.	96.	83.	72.	63.	55.	50.
46.	45.	45.	47.	50.	53.	56.	58.	61.	62.
63.	83.	110.	153.	210.	278.	350.	422.	487.	542.
589.	629.	685.	791.	974.	1252.	1636.	2119.	2688.	3425.
4351.	5349.	6333.	7201.	7816.	8092.	7990.	7512.	6820.	6074.
5329.	4605.	3970.	3428.	2965.	2569.	2230.	1937.	1682.	1458.
1260.	1086.	932.	798.	683.	584.	499.	427.	366.	313.
269.	224.	188.	157.	130.	106.	85.	50.	39.	69.
22.	16.	14.	13.	13.	12.	11.	11.	10.	10.
10.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8092.	6439.	2548.	878.	126856.
CMS	229.	182.	72.	25.	3593.
INCHES		13.40	21.19	21.92	22.01
MM		340.38	538.30	556.80	558.97
AC-FT		3193.	5050.	5223.	5244.
THOUS CU M		3939.	6229.	6443.	6468.

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HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT SILVER CR. RES.

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	3	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-1155.	-1

STAGE	1155.00	1157.00	1160.00	1161.50
FLOW	0.	730.00	2850.00	4280.00
CAPACITY=	0.	221.	476.	1192.
ELEVATION=	1125.	1155.	1160.	1170.

CREL SPWID COOW EXPW [illegible] [illegible] CAREA EXPI

DATA

TOPEL	CR	EXPD	PARATIC
1161.5	2.3	1.5	1500.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	2.	3.	3.	3.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	6.	10.	17.	25.	36.	47.	57.	65.
70.	72.	71.	68.	64.	59.	54.	48.	44.	39.
35.	32.	30.	28.	27.	27.	27.	27.	28.	29.
30.	32.	36.	44.	56.	73.	95.	120.	148.	176.
203.	229.	255.	284.	325.	384.	471.	592.	763.	1164.
1478.	1899.	2354.	2812.	3220.	3544.	3751.	3865.	3709.	3500.
3219.	2901.	2566.	2247.	1953.	1702.	1479.	1284.	1115.	968.
840.	728.	671.	609.	543.	488.	432.	381.	334.	291.
253.	220.	190.	163.	139.	119.	100.	83.	68.	54.
44.	35.	28.	22.	18.	15.	13.	11.	9.	8.
7.	7.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

STORAGE

221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	222.	223.	224.	226.	227.	229.	230.
230.	231.	230.	230.	229.	229.	228.	227.	227.	226.
225.	225.	225.	224.	224.	224.	224.	224.	224.	224.
225.	225.	226.	227.	228.	231.	234.	237.	241.	245.
249.	253.	256.	260.	266.	274.	286.	303.	325.	349.
376.	407.	440.	473.	503.	528.	543.	547.	540.	524.
503.	479.	455.	432.	411.	393.	377.	362.	350.	340.
330.	322.	314.	306.	297.	289.	281.	274.	267.	261.
256.	251.	247.	243.	240.	237.	235.	232.	230.	228.
227.	225.	224.	224.	223.	223.	222.	222.	222.	222.
222.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.
221.	221.	221.	221.	221.	221.	221.	221.	221.	221.

STAGE

1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0
1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0
1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0	1155.0
1155.0	1155.0	1155.0	1155.0	1155.0	1155.1	1155.1	1155.1	1155.2	1155.2
1155.2	1155.2	1155.2	1155.2	1155.2	1155.2	1155.1	1155.1	1155.1	1155.1
1155.1	1155.1	1155.1	1155.1	1155.1	1155.1	1155.1	1155.1	1155.1	1155.1
1155.1	1155.1	1155.1	1155.1	1155.2	1155.2	1155.3	1155.3	1155.4	1155.5
1155.6	1155.6	1155.7	1155.8	1155.9	1156.1	1156.3	1156.6	1157.0	1157.5
1158.1	1158.7	1159.3	1159.9	1160.4	1160.7	1160.9	1161.0	1160.9	1160.7
1160.4	1160.1	1159.6	1159.1	1158.7	1158.4	1158.1	1157.8	1157.5	1157.3
1157.2	1157.0	1156.8	1156.7	1156.5	1156.3	1156.2	1156.1	1156.0	1155.9

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     1155.1    1155.1    1155.1    1155.1    1155.1    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
     1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0

PEAK OUTFLOW IS     3805. AT TIME  44.00 HOURS

                             PEAK     6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                 CFS        3805.      3121.      1268.       439.        63437.
                 CMS         108.        88.        36.        12.         1796.
              INCHES                    6.50      10.55      10.96         11.00
                  MM                  164.98     268.04     278.40        279.44
               AC-FT                   1548.      2515.      2612.         2621.
          THOUS CU M                   1909.      3102.      3221.         3223.

                                 STATION      1, PLAN 1, RATIO 2

                                END-OF-PERIOD HYDROGRAPH ORDINATES

                                          OUTFLOW
         2.        4.        5.        6.        7.        7.        8.        8.        8.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.       10.       13.       21.       33.       51.       72.       94.      115.      131.
       140.      143.      141.      135.      127.      117.      107.       97.       87.       78.
        73.       64.       59.       56.       54.       53.       53.       54.       56.       57.
        59.       63.       72.       87.      112.      146.      189.      240.      295.      352.
       407.      459.      510.      568.      649.      797.     1065.     1438.     1868.     2397.
      3054.     3829.     5219.     7099.     7623.     8056.     8037.     7662.     7022.     6300.
      5574.     4889.     4321.     4039.     3676.     3284.     2903.     2540.     2215.     1928.
      1674.     1451.     1254.     1081.      929.      798.      703.      641.      578.      517.
       458.      403.      352.      306.      264.      226.      193.      160.      131.      106.
        85.       68.       54.       44.       36.       30.       25.       22.       19.       17.
        15.       13.       12.       12.       11.       10.       10.       10.       10.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.
         9.        9.        9.        9.        9.        9.        9.        9.        9.        9.

                                          STORAGE
       221.      221.      221.      221.      221.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      223.      225.      228.      231.      234.      237.      239.
       240.      241.      240.      239.      238.      237.      235.      234.      233.      231.
       230.      229.      229.      228.      228.      228.      228.      228.      228.      228.
       229.      229.      231.      233.      236.      241.      247.      254.      262.      270.
       277.      285.      292.      300.      311.      327.      348.      374.      405.      443.
       491.      549.      603.      629.      635.      639.      639.      635.      628.      615.
       609.      598.      585.      565.      538.      508.      479.      453.      430.      409.
       391.      375.      360.      348.      337.      327.      319.      310.      301.      293.
       284.      277.      270.      263.      257.      252.      247.      243.      239.      235.
       232.      230.      228.      227.      226.      225.      224.      224.      223.      223.
       223.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
       222.      222.      222.      222.      222.      222.      222.      222.      222.      222.
```

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    222.      222.      222.      222.      222.      222.      222.      222.      222.      222.

                                            STAGE
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.1    1155.1    1155.1    1155.2    1155.3    1155.3    1155.4
  1155.4    1155.4    1155.4    1155.4    1155.3    1155.3    1155.3    1155.3    1155.2    1155.2
  1155.2    1155.2    1155.2    1155.2    1155.1    1155.1    1155.1    1155.1    1155.2    1155.2
  1155.2    1155.2    1155.2    1155.2    1155.3    1155.4    1155.5    1155.7    1155.8    1156.0
  1156.1    1156.3    1156.4    1156.6    1156.8    1157.1    1157.5    1158.0    1158.6    1159.4
  1160.2    1161.0    1161.8    1162.1    1162.2    1162.3    1162.3    1162.2    1162.1    1162.0
  1161.9    1161.7    1161.5    1161.2    1160.9    1160.5    1160.1    1159.6    1159.1    1158.7
  1158.3    1158.0    1157.7    1157.5    1157.3    1157.1    1156.9    1156.8    1156.6    1156.4
  1156.3    1156.1    1156.0    1155.8    1155.7    1155.6    1155.5    1155.4    1155.4    1155.3
  1155.2    1155.2    1155.1    1155.1    1155.1    1155.1    1155.1    1155.1    1155.1    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0
  1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0    1155.0

PEAK OUTFLOW IS     8056. AT TIME  43.00 HOURS

                                  PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                        CFS       8056.     6312.   [illegible]     878.        126875.
                        CMS        228.      179.   [illegible]      25.          3594.
                     INCHES                 13.13   21.[illegible]    21.92          22.00
                         MM                333.63   530.[illegible]   556.80         558.87
                      AC-FT                 3130.   50[illegible]     5223.          5243.
                 THOUS CU M                 3860.   62[illegible]     6443.          6467.



         **********          **********          **********          **********          **********

                                          SUB-AREA RUNOFF COMPUTATION

                        INFLOW TO SMITH MILLS RES. FROM LOWER SUBBASIN
                                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                        2       0       0       0       0       0       1       0       0

                                                     HYDROGRAPH DATA
                        IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                            1       1   11.42      0.   15.89      0.      0.       0       0       0

                                                       PRECIP DATA
                                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                                      0.   22.50  107.00  120.00  13 .00  139.00      0.      0.
TRSPC COMPUTED BY THE PROGRAM IS 0.816

                                                        LOSS DATA
                  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                      0      0.      0.    1.00      0.      0.    1.00    1.00    0.10      0.      0.

                                                 UNIT HYDROGRAPH DATA
                                          TP=  4.52    CP=0.63     NTA=  0

                                                     RECESSION DATA
                                  STRTQ=   -2.00    QRCSN=    2.00    RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 9.97 AND R= 8.30 INTERVALS
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UNIT HYDROGRAPH 50 END-OF-PERIOD ORDINATES, LAG= 4.49 HRS, CP= 0.45 VOL= 1.0

38.	140.	281.	444.	618.	787.	921.	1010.	1052.	1036.	
955.	846.	750.	665.	589.	522.	463.	411.	364.	323.	
284.	253.	225.	199.	177.	156.	139.	123.	109.	97.	
86.	76.	67.	60.	53.	47.	42.	37.	33.	29.	
26.	23.	20.	18.	16.	14.	12.	11.	10.	9.	

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.30	1	0.00	0.	0.00	23.	1.03	2.30	101	0.	0.	0.	5026.
1.01	1.00	2	0.00	0.	0.00	23.	1.03	3.00	102	0.	0.	0.	4487.
1.01	1.30	3	0.00	0.	0.00	23.	1.03	3.30	103	0.	0.	0.	4060.
1.01	2.00	4	0.00	0.	0.00	23.	1.03	4.00	104	0.	0.	0.	3681.
1.01	2.30	5	0.00	0.	0.00	23.	1.03	4.30	105	0.	0.	0.	3365.
1.01	3.00	6	0.00	0.	0.00	23.	1.03	5.00	106	0.	0.	0.	2809.
1.01	3.30	7	0.00	0.	0.00	23.	1.03	5.30	107	0.	0.	0.	2493.
1.01	4.00	8	0.00	0.	0.00	23.	1.03	6.00	108	0.	0.	0.	2212.
1.01	4.30	9	0.00	0.	0.00	23.	1.03	6.30	109	0.	0.	0.	1964.
1.01	5.00	10	0.00	0.	0.00	23.	1.03	7.00	110	0.	0.	0.	1743.
1.01	5.30	11	0.00	0.	0.00	23.	1.03	7.30	111	0.	0.	0.	1546.
1.01	6.00	12	0.00	0.	0.00	23.	1.03	8.00	112	0.	0.	0.	1372.
1.01	6.30	13	0.01	0.	0.01	23.	1.03	8.30	113	0.	0.	0.	1218.
1.01	7.00	14	0.01	0.	0.01	23.	1.03	9.00	114	0.	0.	0.	1081.
1.01	7.30	15	0.01	0.	0.01	23.	1.03	9.30	115	0.	0.	0.	960.
1.01	8.00	16	0.01	0.	0.01	23.	1.03	10.00	116	0.	0.	0.	852.
1.01	8.30	17	0.01	0.	0.01	23.	1.03	10.30	117	0.	0.	0.	757.
1.01	9.00	18	0.01	0.	0.01	23.	1.03	11.00	118	0.	0.	0.	672.
1.01	9.30	19	0.01	0.	0.01	23.	1.03	11.30	119	0.	0.	0.	597.
1.01	10.00	20	0.01	0.	0.01	23.	1.03	12.00	120	0.	0.	0.	531.
1.01	10.30	21	0.01	0.	0.01	23.	1.03	12.30	121	0.	0.	0.	472.
1.01	11.00	22	0.01	0.	0.01	23.	1.03	13.00	122	0.	0.	0.	420.
1.01	11.30	23	0.01	0.	0.01	23.	1.03	13.30	123	0.	0.	0.	368.
1.01	12.00	24	0.01	0.	0.01	23.	1.03	14.00	124	0.	0.	0.	321.
1.01	12.30	25	0.07	0.	0.07	23.	1.03	14.30	125	0.	0.	0.	279.
1.01	13.00	26	0.07	0.	0.07	23.	1.03	15.00	126	0.	0.	0.	241.
1.01	13.30	27	0.08	0.	0.08	23.	1.03	15.30	127	0.	0.	0.	205.
1.01	14.00	28	0.08	0.	0.08	23.	1.03	16.00	128	0.	0.	0.	174.
1.01	14.30	29	0.10	0.	0.10	23.	1.03	16.30	129	0.	0.	0.	143.
1.01	15.00	30	0.10	0.	0.10	23.	1.03	17.00	130	0.	0.	0.	86.
1.01	15.30	31	0.12	0.	0.12	23.	1.03	17.30	131	0.	0.	0.	69.
1.01	16.00	32	0.39	0.21	0.19	31.	1.03	18.00	132	0.	0.	0.	54.
1.01	16.30	33	0.10	0.05	0.05	53.	1.03	18.30	133	0.	0.	0.	42.
1.01	17.00	34	0.10	0.05	0.05	69.	1.03	19.00	134	0.	0.	0.	32.
1.01	17.30	35	0.07	0.02	0.05	134.	1.03	19.30	135	0.	0.	0.	31.
1.01	18.00	36	0.07	0.02	0.05	187.	1.03	20.00	136	0.	0.	0.	29.
1.01	18.30	37	0.01	0.	0.01	243.	1.03	20.30	137	0.	0.	0.	28.
1.01	19.00	38	0.01	0.	0.01	294.	1.03	21.00	138	0.	0.	0.	27.
1.01	19.30	39	0.01	0.	0.01	334.	1.03	21.30	139	0.	0.	0.	27.
1.01	20.00	40	0.01	0.	0.01	361.	1.03	22.00	140	0.	0.	0.	26.
1.01	20.30	41	0.01	0.	0.01	371.	1.03	22.30	141	0.	0.	0.	25.
1.01	21.00	42	0.01	0.	0.01	361.	1.03	23.00	142	0.	0.	0.	25.
1.01	21.30	43	0.01	0.	0.01	336.	1.03	23.30	143	0.	0.	0.	24.
1.01	22.00	44	0.01	0.	0.01	310.	1.04	0.	144	0.	0.	0.	24.
1.01	22.30	45	0.01	0.	0.01	281.	1.04	0.30	145	0.	0.	0.	23.
1.01	23.00	46	0.01	0.	0.01	253.	1.04	1.00	146	0.	0.	0.	23.
1.01	23.30	47	0.01	0.	0.01	227.	1.04	1.30	147	0.	0.	0.	23.
1.02	0.	48	0.01	0.	0.01	203.	1.04	2.00	148	0.	0.	0.	23.
1.02	0.30	49	0.06	0.01	0.05	183.	1.04	2.30	149	0.	0.	0.	23.
1.02	1.00	50	0.06	0.01	0.05	167.	1.04	3.00	150	0.	0.	0.	23.
1.02	1.30	51	0.06	0.01	0.05	154.	1.04	3.30	151	0.	0.	0.	23.
1.02	2.00	52	0.06	0.01	0.05	144.	1.04	4.00	152	0.	0.	0.	23.
1.02	2.30	53	0.06	0.01	0.05	139.	1.04	4.30	153	0.	0.	0.	23.
1.02	3.00	54	0.06	0.01	0.05	136.	1.04	5.00	154	0.	0.	0.	23.
1.02	3.30	55	0.06	0.01	0.05	137.	1.04	5.30	155	0.	0.	0.	23.
1.02	4.00	56	0.06	0.01	0.05	139.	1.04	6.00	156	0.	0.	0.	23.
1.02	4.30	57	0.06	0.01	0.04	143.	1.04	6.30	157	0.	0.	0.	23.

1.02	5.00	58	0.06	0.01	0.05	152.	1.04	7.00	159	0.	0.	0.	23.	
1.02	5.30	59	0.06	0.01	0.05	152.	1.04	7.30	159	0.	0.	0.	23.	
1.02	6.00	60	0.06	0.01	0.05	156.	1.04	8.00	160	0.	0.	0.	23.	
1.02	6.30	61	0.20	0.15	0.05	165.	1.04	8.30	161	0.	0.	0.	23.	
1.02	7.00	62	0.20	0.15	0.05	167.	1.04	9.00	162	0.	0.	0.	23.	
1.02	7.30	63	0.20	0.15	0.05	229.	1.04	9.30	163	0.	0.	0.	23.	
1.02	8.00	64	0.20	0.15	0.05	292.	1.04	10.00	164	0.	0.	0.	23.	
1.02	8.30	65	0.20	0.15	0.05	380.	1.04	10.30	165	0.	0.	0.	23.	
1.02	9.00	66	0.20	0.15	0.05	490.	1.04	11.00	166	0.	0.	0.	23.	
1.02	9.30	67	0.20	0.15	0.05	618.	1.04	11.30	167	0.	0.	0.	23.	
1.02	10.00	68	0.20	0.15	0.05	759.	1.04	12.00	168	0.	0.	0.	23.	
1.02	10.30	69	0.20	0.15	0.05	905.	1.04	12.30	169	0.	0.	0.	23.	
1.02	11.00	70	0.20	0.15	0.05	1049.	1.04	13.00	170	0.	0.	0.	23.	
1.02	11.30	71	0.20	0.15	0.05	1181.	1.04	13.30	171	0.	0.	0.	23.	
1.02	12.00	72	0.20	0.15	0.05	1299.	1.04	14.00	172	0.	0.	0.	23.	
1.02	12.30	73	0.98	0.93	0.05	1432.	1.04	14.30	173	0.	0.	0.	23.	
1.02	13.00	74	0.98	0.93	0.05	1634.	1.04	15.00	174	0.	0.	0.	23.	
1.02	13.30	75	1.18	1.13	0.05	1944.	1.04	15.30	175	0.	0.	0.	23.	
1. 2	14.00	76	1.18	1.13	0.05	2391.	1.04	16.00	176	0.	0.	0.	23.	
.2	14.30	77	1.47	1.42	0.05	3006.	1.04	16.30	177	0.	0.	0.	23.	
02	15.00	78	1.47	1.42	0.05	3807.	1.04	17.00	178	0.	0.	0.	23.	
1.02	15.30	79	1.79	1.74	0.05	4795.	1.04	17.30	179	0.	0.	0.	23.	
1.02	16.00	80	5.67	5.62	0.05	6106.	1.04	18.00	180	0.	0.	0.	23.	
1.02	16.30	81	1.37	1.32	0.05	7802.	1.04	18.30	181	0.	0.	0.	23.	
1.02	17.00	82	1.37	1.32	0.05	9711.	1.04	19.00	182	0.	0.	0.	23.	
1.02	17.30	83	1.08	1.03	0.05	11666.	1.04	19.30	183	0.	0.	0.	23.	
1.02	18.00	84	1.08	1.03	0.05	13558.	1.04	20.00	184	0.	0.	0.	23.	
1.02	18.30	85	0.09	0.04	0.05	15237.	1.04	20.30	185	0.	0.	0.	23.	
1.02	19.00	86	0.09	0.04	0.05	16499.	1.04	21.00	186	0.	0.	0.	23.	
1.02	19.30	87	0.09	0.04	0.05	17243.	1.04	21.30	187	0.	0.	0.	23.	
1.02	20.00	88	0.09	0.04	0.05	17451.	1.04	22.00	188	0.	0.	0.	23.	
1.02	20.30	89	0.09	0.04	0.05	17089.	1.04	22.30	189	0.	0.	0.	23.	
1.02	21.00	90	0.09	0.04	0.05	16168.	1.04	23.00	190	0.	0.	0.	23.	
1.02	21.30	91	0.09	0.04	0.05	14929.	1.04	23.30	191	0.	0.	0.	23.	
1.02	22.00	92	0.09	0.04	0.05	13610.	1.05	0.	192	0.	0.	0.	23.	
1.02	22.30	93	0.09	0.04	0.05	12275.	1.05	0.30	193	0.	0.	0.	23.	
1.02	23.00	94	0.09	0.04	0.05	10989.	1.05	1.00	194	0.	0.	0.	23.	
1.02	23.30	95	0.09	0.04	0.05	9813.	1.05	1.30	195	0.	0.	0.	23.	
1.03	0.	96	0.09	0.04	0.05	8771.	1.05	2.00	196	0.	0.	0.	23.	
1.03	0.30	97	0.	0.	0.	7846.	1.05	2.30	197	0.	0.	0.	23.	
1.03	1.00	98	0.	0.	0.	7021.	1.05	3.00	198	0.	0.	0.	23.	
1.03	1.30	99	0.	0.	0.	6284.	1.05	3.30	199	0.	0.	0.	23.	
1.03	2.00	100	0.	0.	0.	5622.	1.05	4.00	200	0.	0.	0.	23.	

SUM	25.51	21.81	3.71	324340.
	(648.)	(554.)	(94.)	(9184.29)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	17451.	14673.	6406.	2243.	324306.
CMS	494.	415.	181.	64.	9183.
INCHES		11.95	20.66	21.93	22.01
MM		303.58	530.31	556.99	559.16
AC-FT		7276.	12710.	13349.	13401.
THOUS CU M		8975.	15677.	16466.	16530.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 1

11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	15.	27.	44.	67.	94.	122.	147.	167.	181.
186.	181.	169.	155.	141.	126.	113.	102.	92.	83.
77.	72.	69.	68.	68.	70.	71.	74.	76.	78.
82.	94.	114.	146.	190.	245.	309.	380.	453.	525.
591.	649.	716.	817.	972.	1195.	1503.	1903.	2398.	3052.
3901.	4855.	5833.	6770.	7610.	8299.	8800.	9111.	9241.	9208.

2513.	2244.	2000.	1780.	1582.	1405.	1248.	1104.	982.	872.
773.	686.	609.	541.	480.	426.	378.	336.	299.	266.
236.	210.	184.	161.	139.	121.	103.	87.	72.	42.
34.	27.	21.	16.	15.	15.	14.	14.	13.	13.
13.	12.	12.	12.	12.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8725.	7336.	3204.	1122.	162153.
CMS	247.	208.	91.	32.	4592.
INCHES		5.98	10.49	10.96	11.01
MM		151.79	265.16	278.49	279.56
AC-FT		3638.	6355.	6675.	6701.
THOUS CU M		4487.	7839.	8233.	8265.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIC 2

23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	31.	53.	89.	134.	187.	243.	294.	334.	361.
371.	361.	338.	310.	281.	253.	227.	203.	183.	167.
154.	144.	139.	136.	137.	139.	143.	148.	152.	156.
169.	187.	229.	292.	380.	490.	618.	759.	905.	1049.
1181.	1299.	1432.	1634.	1944.	2391.	3006.	3807.	4795.	6106.
7802.	9711.	11666.	13558.	15237.	16499.	17243.	17451.	17085.	16168.
14929.	13610.	12275.	10989.	9813.	8771.	7846.	7021.	6284.	5622.
5026.	4487.	4000.	3561.	3165.	2809.	2493.	2212.	1964.	1743.
1546.	1372.	1218.	1081.	960.	852.	757.	672.	597.	531.
472.	420.	368.	321.	279.	241.	205.	174.	143.	86.
69.	54.	42.	32.	31.	29.	28.	27.	27.	26.
25.	25.	24.	24.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	17451.	14673.	6408.	2243.	324306.
CMS	494.	415.	181.	64.	9183.
INCHES		11.95	20.98	21.93	22.01
MM		303.58	530.31	556.99	559.16
AC-FT		7276.	12710.	13349.	13401.
THOUS CU M		8975.	15677.	16466.	16530.

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COMBINE HYDROGRAPHS

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	2	0	0	0	0	0	0	0

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIC 1

13.	13.	14.	15.	15.	15.	15.	15.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
18.	20.	33.	59	84	119	159	194	--	-

112.	104.	99.	96.	95.	[illegible]	98.	101.	104.	107.
112.	125.	150.	190.	244.	314.	404.	494.	580.	638.
794.	879.	971.	1101.	1296.	[illegible]	1974.	2494.	3160.	[illegible]
5379.	6755.	8187.	9591.	10838.	[illegible]	12372.	12554.	12557.	[illegible]
10644.	9706.	8703.	7741.	6865.	[illegible]	5462.	4795.	4257.	[illegible]
3352.	2972.	2671.	2390.	2130.	1893.	1679.	1487.	1315.	1162.
1027.	906.	799.	703.	619.	545.	479.	419.	368.	325.
289.	245.	212.	183.	159.	140.	115.	93.	83.	57.
42.	34.	27.	22.	21.	20.	19.	19.	18.	18.
17.	17.	17.	16.	15.	15.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12530.	10458.	4477.	1561.	225691.
CMS	355.	296.	127.	44.	6389.
INCHES		6.12	10.47	10.96	11.01
MM		155.50	265.77	278.47	279.64
AC-FT		5186.	8870.	9286.	9422.
THOUS CU M		6396.	10940.	11454.	11498.

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIC 2

25.	27.	28.	29.	30.	30.	31.	31.	31.	31.
31.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	40.	66.	109.	167.	238.	315.	385.	449.	492.
512.	505.	479.	446.	408.	370.	334.	309.	270.	245.
224.	208.	198.	192.	193.	192.	196.	202.	208.	213.
224.	251.	301.	380.	491.	636.	808.	999.	1200.	1401.
1568.	1758.	1942.	2202.	2593.	3188.	4091.	5245.	6663.	8503.
10856.	13539.	16285.	20657.	22865.	24555.	25280.	25112.	24111.	22468.
20504.	18498.	16596.	15028.	13489.	12055.	10749.	9561.	8491.	7549.
6700.	5938.	5255.	4642.	4094.	3607.	3196.	2854.	2542.	2260.
2005.	1775.	1570.	1387.	1224.	1078.	949.	833.	728.	637.
557.	488.	422.	365.	315.	271.	231.	195.	162.	133.
84.	67.	54.	44.	42.	40.	38.	37.	36.	35.
34.	34.	33.	33.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
32.	32.	32.	32.	32.	32.	32.	32.	32.	32.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	25280.	20985.	8944.	3121.	451181.
CMS	716.	594.	253.	88.	12776.
INCHES		12.28	20.94	21.93	22.01
MM		312.03	531.98	556.94	559.08
AC-FT		10406.	17740.	18573.	18644.
THOUS CU M		12835.	21892.	22909.	22997.

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HYDROGRAPH ROUTING

ROUTE TOTAL BASIN RUNOFF THROUGH SMITH MILLS.

ISTAO ICOMP ICOUN ITAPE JPLT JPRT INAME

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	C	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STLRA	ISPRAT
1	0	0	0. 0.		C.	-854.	-1

STAGE	853.40	853.50	854.00	855.00	857.00	859.00
FLOW	0.	2.50	110.00	550.00	1927.00	3778.00
CAPACITY=	0.	1.	3.	10.	23.	50.
ELEVATION=	842.	844.	846.	848.	850.	854.

CREL	SPWID	COOW	EXPW	ELEVL	CCCL	CAREA	EXPL
853.6	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COOD	EXPD	DAMWID
854.0	3.2	1.5	100.

STATION 3> PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

10.	12.	13.	14.	15.	15.	15.	15.	15.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	17.	25.	40.	63.	93.	135.	184.	216.	241.
254.	254.	244.	228.	210.	191.	172.	155.	140.	127.
116.	109.	103.	99.	97.	96.	97.	99.	101.	104.
108.	120.	142.	178.	230.	299.	384.	479.	580.	681.
777.	964.	959.	1080.	1267.	1538.	1915.	2427.	3078.	4041.
5271.	6627.	8074.	9479.	10752.	11732.	12344.	12521.	12289.	11645.
10758.	9783.	8784.	7817.	6936.	6151.	5459.	4846.	4304.	3822.
3396.	3014.	2701.	2425.	2159.	1922.	1704.	1511.	1337.	1183.
1045.	922.	816.	721.	635.	559.	492.	432.	378.	330.
289.	253.	220.	190.	165.	142.	122.	106.	93.	72.
52.	41.	33.	26.	23.	21.	20.	19.	19.	18.
18.	17.	17.	17.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.

STORAGE

47.	47.	47.	47.	47.	47.	47.	47.	47.	47.
47.	47.	47.	47.	47.	47.	47.	47.	47.	47.
47.	47.	47.	47.	47.	47.	47.	47.	47.	47.
47.	47.	47.	48.	49.	49.	50.	51.	51.	52.
52.	52.	52.	51.	51.	51.	51.	51.	50.	50.
50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
50.	50.	50.	51.	51.	52.	53.	54.	55.	55.
56.	57.	57.	58.	59.	61.	63.	65.	68.	72.
77.	82.	87.	92.	96.	99.	101.	101.	100.	98.
94.	92.	89.	86.	83.	80.	78.	75.	73.	72.
70.	68.	67.	65.	64.	63.	62.	60.	60.	59.
58.	57.	56.	56.	55.	54.	54.	53.	53.	52.
52.	52.	51.	51.	51.	50.	50.	50.	49.	49.
48.	48.	48.	47.	47.	47.	47.	47.	47.	47.
47.	47.	47.	47.	47.	47.	47.	47.	47.	47.

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             47.       47.       47.       47.       47.       47.       47.       47.       47.
   47.       47.       47.       47.       47.       47.       47.       47.       47.       47.
   47.       47.       47.       47.       47.       47.       47.       47.       47.       47.

                                            STAGE
  853.5     853.5     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.7     853.8     853.9     854.1     854.1     854.2     854.2
  854.2     854.2     854.2     854.2     854.2     854.1     854.1     854.1     854.1     854.0
  854.0     854.0     854.0     853.9     853.9     853.9     853.9     853.9     854.0     854.0
  854.0     854.0     854.1     854.1     854.2     854.3     854.4     854.5     854.7     854.8
  854.9     855.0     855.1     855.2     855.3     855.5     855.8     856.2     856.7     857.3
  857.9     858.6     859.4     860.0     860.6     861.1     861.4     861.4     861.3     861.0
  860.6     860.2     859.7     859.2     858.8     858.4     858.0     857.7     857.4     857.1
  856.9     856.6     856.4     856.2     856.0     855.8     855.7     855.5     855.4     855.3
  855.1     855.0     854.9     854.8     854.7     854.6     854.6     854.5     854.4     854.3
  854.3     854.2     854.2     854.1     854.1     854.1     854.0     854.0     853.9     853.8
  853.7     853.7     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
  853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6

PEAK OUTFLOW IS    12531. AT TIME  44.00 HOURS

                                 PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                     CFS        12531.    10452.     4471.     1561.        225550.
                     CMS          355.      296.      127.       44.          6388.
                  INCHES                    6.12     10.47     10.96          11.01
                      MM                  155.41    265.95    278.47         279.54
                   AC-FT                   5183.     8869.     9286.          9322.
              THOUS CU M                   6393.    10939.    11455.         11458.

                                   STATION      3, PLAN 1, RATIO 2

                                  END-OF-PERIOD HYDROGRAPH ORDINATES

                                            OUTFLOW
   29.       24.       26.       28.       29.       30.       30.       31.       31.       31.
   31.       31.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       35.       49.       79.      134.      223.      295.      373.      437.      484.
  509.      509.      486.      453.      417.      378.      342.      308.      277.      251.
  229.      213.      200.      193.      191.      191.      195.      200.      206.      212.
  221.      242.      287.      360.      465.      605.      774.      969.     1174.     1374.
 1565.     1737.     1918.     2166.     2540.     3110.     3988.     5138.     6527.     6238.
10655.    13337.    16618.    20408.    22800.    24417.    25309.    25109.    24226.    22566.
20656.    18619.    16734.    15118.    13617.    12146.    10854.     9644.     8584.     7620.
 6771.     6000.     5311.     4694.     4143.     3650.     3241.     2864.     2579.     2291.
 2035.     1802.     1596.     1410.     1245.     1097.      967.      850.      748.      653.
  573.      501.      436.      377.      326.      281.      240.      204.      171.      122.
   95.       80.       65.       52.       45.       42.       40.       38.       37.       36.
   35.       34.       34.       33.       33.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.
   32.       32.       32.       32.       32.       32.       32.       32.       32.       32.

                                            STORAGE
   47.
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```
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      45.       48.       48.       49.       50.       51.       52.       51.       53.       54.
                54.       54.       54.       53.       53.       53.       52.       52.       52.
      51.       51.       51.       51.       51.       51.       51.       51.       51.       51.
      51.       52.       52.       53.       54.       55.       56.       57.       59.       60.
      61.       62.       63.       64.       66.       68.       72.       77.       82.       88.
      95.      104.      113.      124.      130.      135.      137.      137.      134.      130.
     125.      119.      114.      109.      104.      102.       96.       92.       89.       85.
      82.       80.       77.       75.       73.       71.       69.       67.       66.       65.
      63.       62.       61.       60.       59.       58.       57.       57.       56.       55.
      55.       54.       53.       53.       52.       52.       52.       51.       51.       50.
      50.       49.       49.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.
      48.       48.       48.       48.       48.       48.       48.       48.       48.       48.

                                                     STAGE
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.7     853.9     854.0     854.2     854.3     854.4     854.5     854.6
   854.6     854.6     854.6     854.5     854.5     854.4     854.4     854.3     854.3     854.2
   854.2     854.2     854.2     854.1     854.1     854.1     854.2     854.2     854.2     854.2
   854.2     854.2     854.3     854.4     854.5     854.7     854.9     855.1     855.3     855.4
   855.6     855.7     855.8     856.0     856.3     856.7     857.2     857.9     858.6     859.5
   860.5     861.8     863.2     864.8     865.7     866.3     866.7     866.6     866.3     865.3
   864.9     864.0     863.3     862.6     861.9     861.3     860.7     860.1     859.6     859.1
   858.7     858.3     857.9     857.6     857.3     857.0     856.8     856.5     856.3     856.1
   855.9     855.7     855.6     855.4     855.3     855.2     855.1     855.0     854.9     854.8
   854.7     854.6     854.5     854.4     854.3     854.3     854.2     854.2     854.1     854.0
   853.9     853.9     853.8     853.7     853.7     853.7     853.7     853.7     853.7     853.7
   853.7     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6
   853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6     853.6

PEAK OUTFLOW IS    25309. AT TIME  43.50 HOURS

                              PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                   CFS      25309.    20974.     8944.      3121.       451172.
                   CMS        717.      594.      253.        88.        12776.
                INCHES                 12.28     20.94      21.93         22.01
                    MM                311.87    531.96     556.94        559.06
                 AC-FT                10400.    17740.     18573.        18643.
            THOUS CU M                12829.    21882.     22909.        22956.


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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.50	 RATIO 2 1.00
HYDROGRAPH AT	1	4.47	1	4046.	8092.
	(	0.00)	(	114.57)(	229.15)(
ROUTED TO	1	4.47	1	3805.	8056.
	(	0.00)	(	107.73)(	228.12)(
HYDROGRAPH AT	2	11.42	1	8725.	17451.
	(	0.00)	(	247.07)(	494.15)(
2 COMBINED	3	15.89	1	12530.	25280.
	(	0.00)	(	354.81)(	715.85)(
ROUTED TO	3	15.89	1	12531.	25309.
	(	0.00)	(	354.82)(	716.66)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1155.00	1155.00	1161.50
STORAGE	221.	221.	583.
OUTFLOW	0.	0.	4280.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1161.00	0.	547.	3305.	0.	44.00	0.
1.00	1162.29	0.79	639.	8056.	5.50	43.00	0.

SUMMARY OF SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	853.50	853.00	864.00
STORAGE	47.	47.	50.
OUTFLOW	3.	24.	110.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	861.44	7.44	101.	12931.	40.50	44.00	0.
1.00	866.67	12.67	137.	25309.	48.00	43.50	0.

LIST OF REFERENCES

APPENDIX E

APPENDIX E

REFERENCES

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2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).

3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

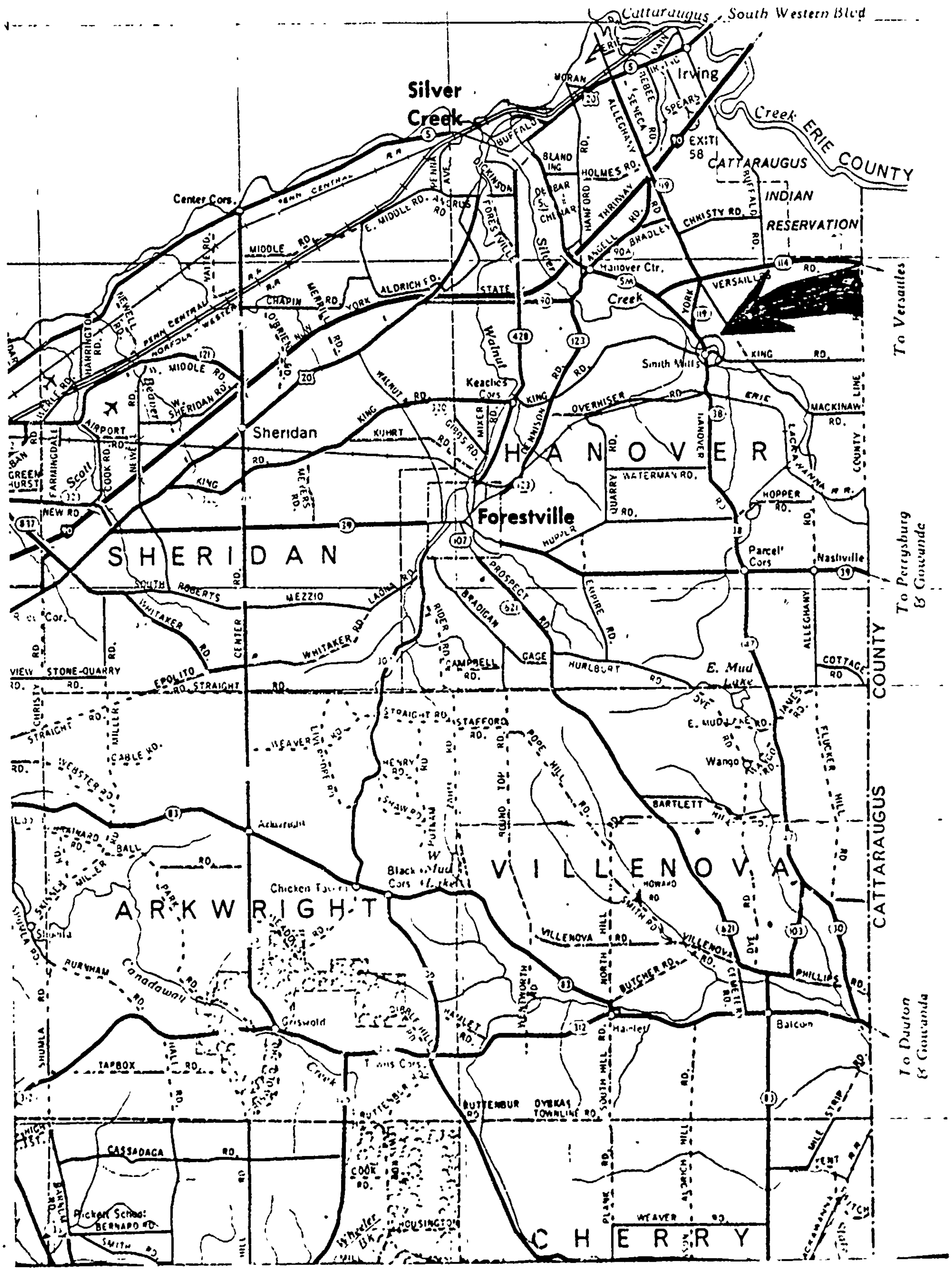
5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

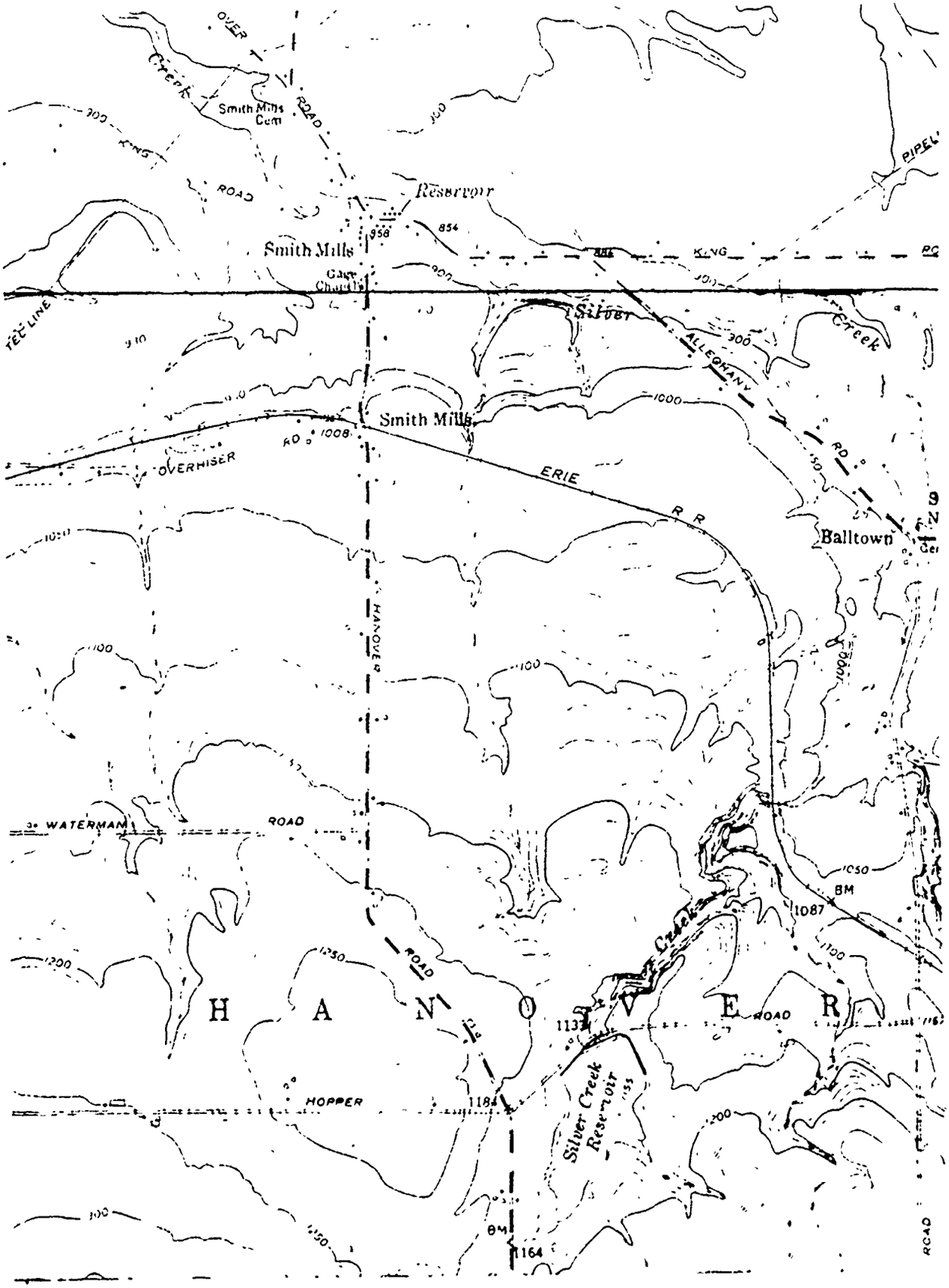
7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX F

DRAWINGS



VICINITY MAP

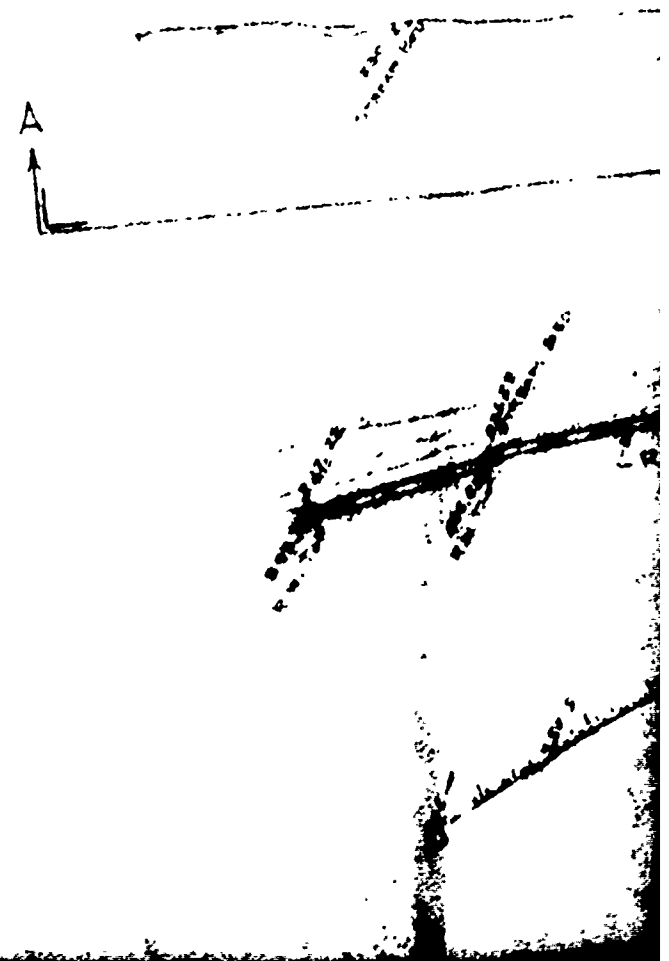


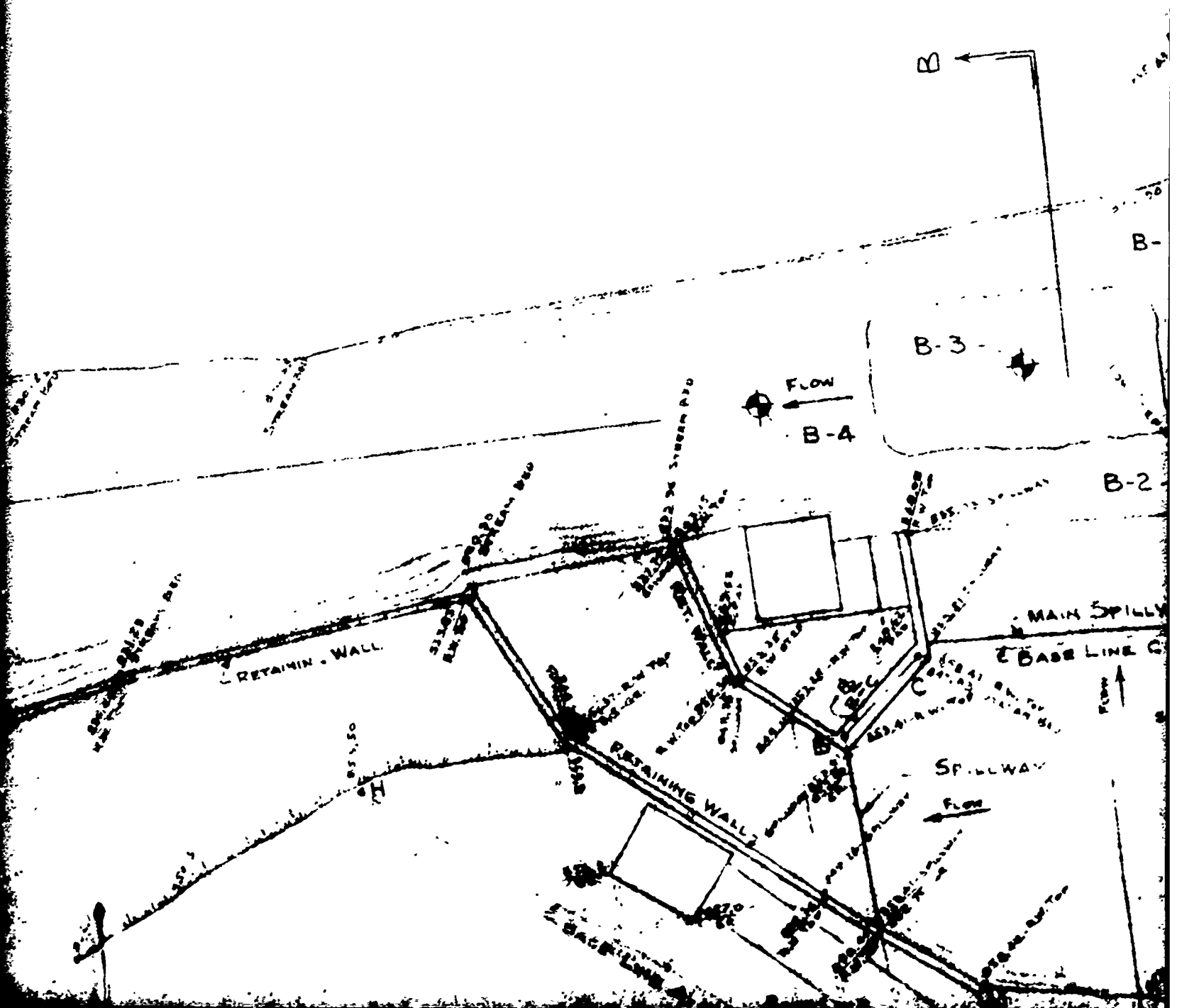
TOPOGRAPHIC MAP

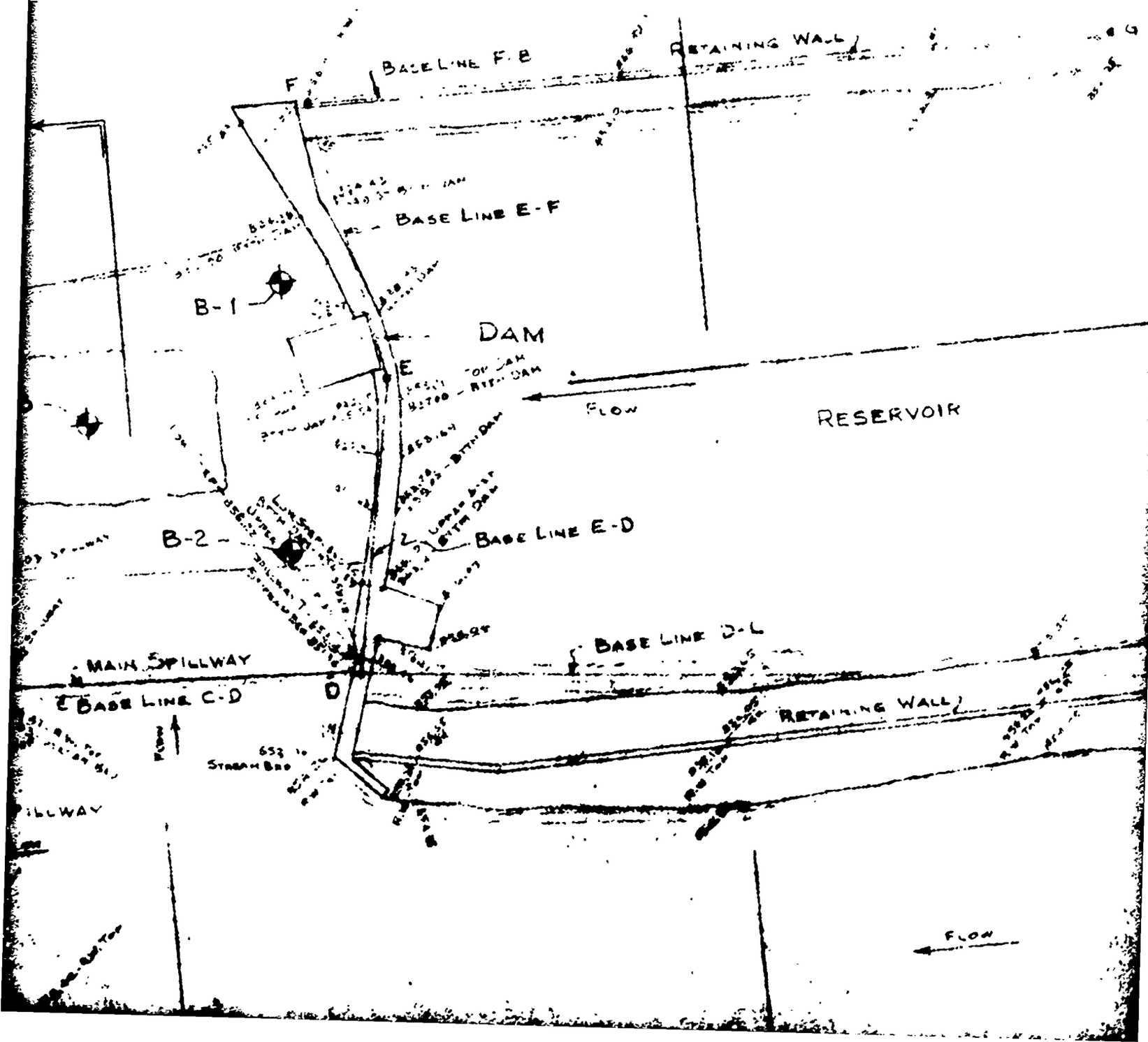
SMITH MILLS RESERVOIR DAM

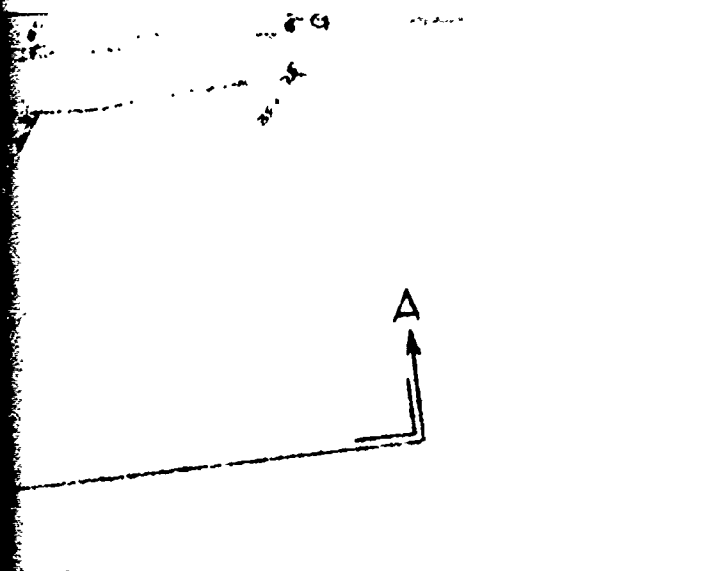
LIST OF DRAWINGS

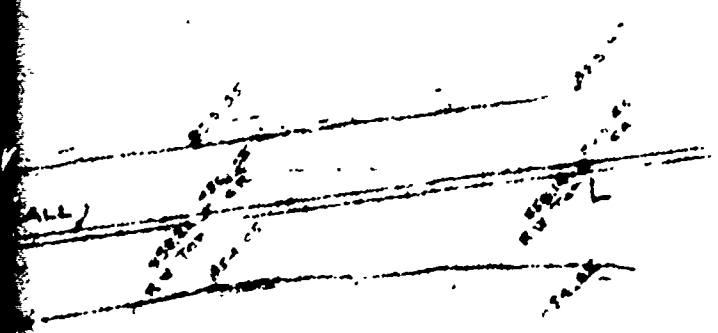
	DRAWING NO.
Topographic Survey Plan and Boring Layout	1 of 2
Sections	2 of 2


A


B
B-3
B-4
FLOW
B-2
RETAINING WALL
MAIN SPILLW
BASE LINE C
SPILLWAY
FLOW
RETAINING WALL
BACKFILL


BASE LINE F-B
RETAINING WALL
F
G
BASE LINE E-F
B-1
DAM
E
FLOW
RESERVOIR
B-2
BASE LINE E-D
MAIN SPILLWAY
BASE LINE D-L
BASE LINE C-D
D
RETAINING WALL
FLOW





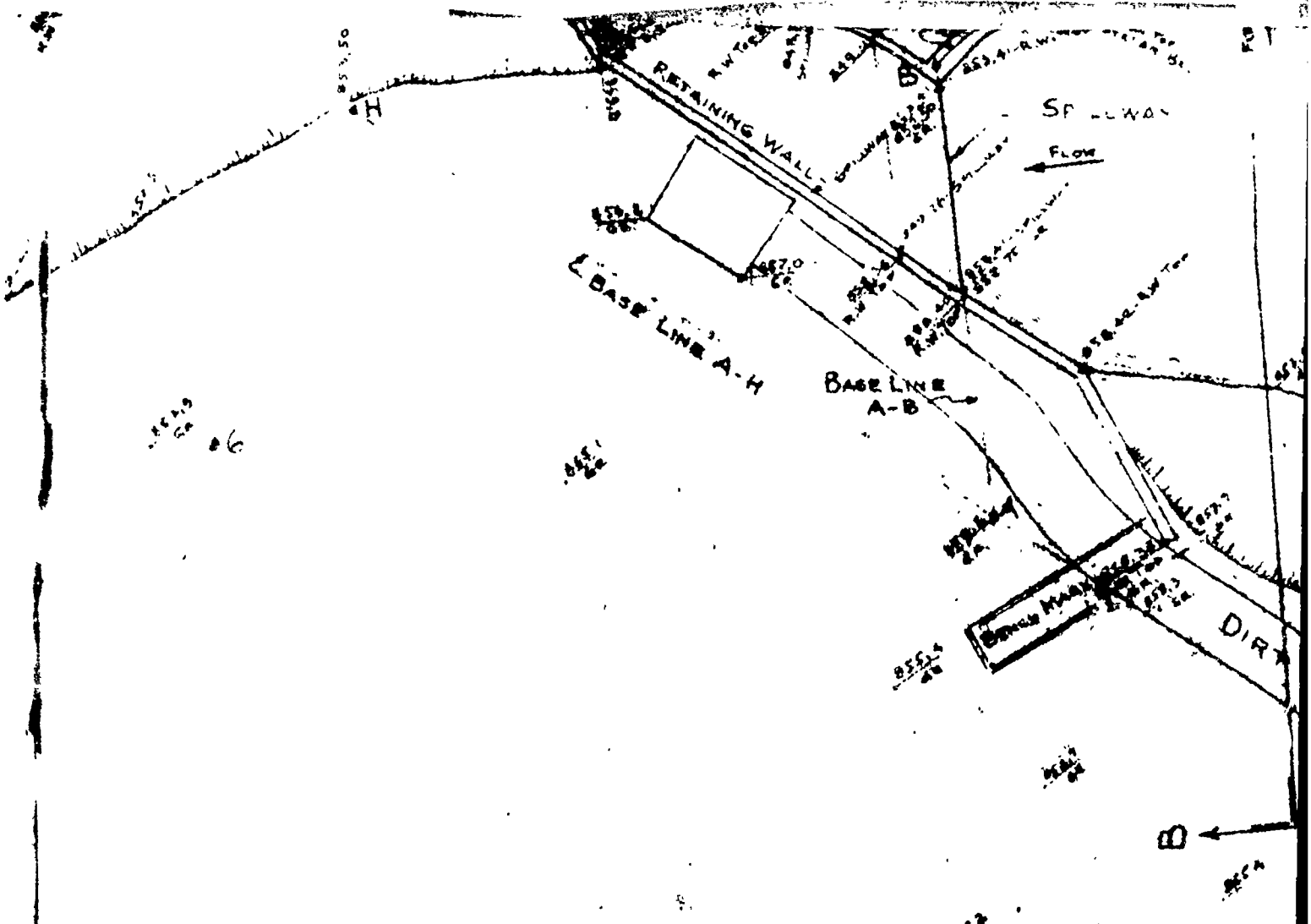
FLOW

TOPOGRAPHIC SURVEY OF
SMITH MILLS RESERVOIR
HANOVER TWP., CHAUTAUQUA C
NEW YORK

SCALE: 1"=20'

NOVEMBER

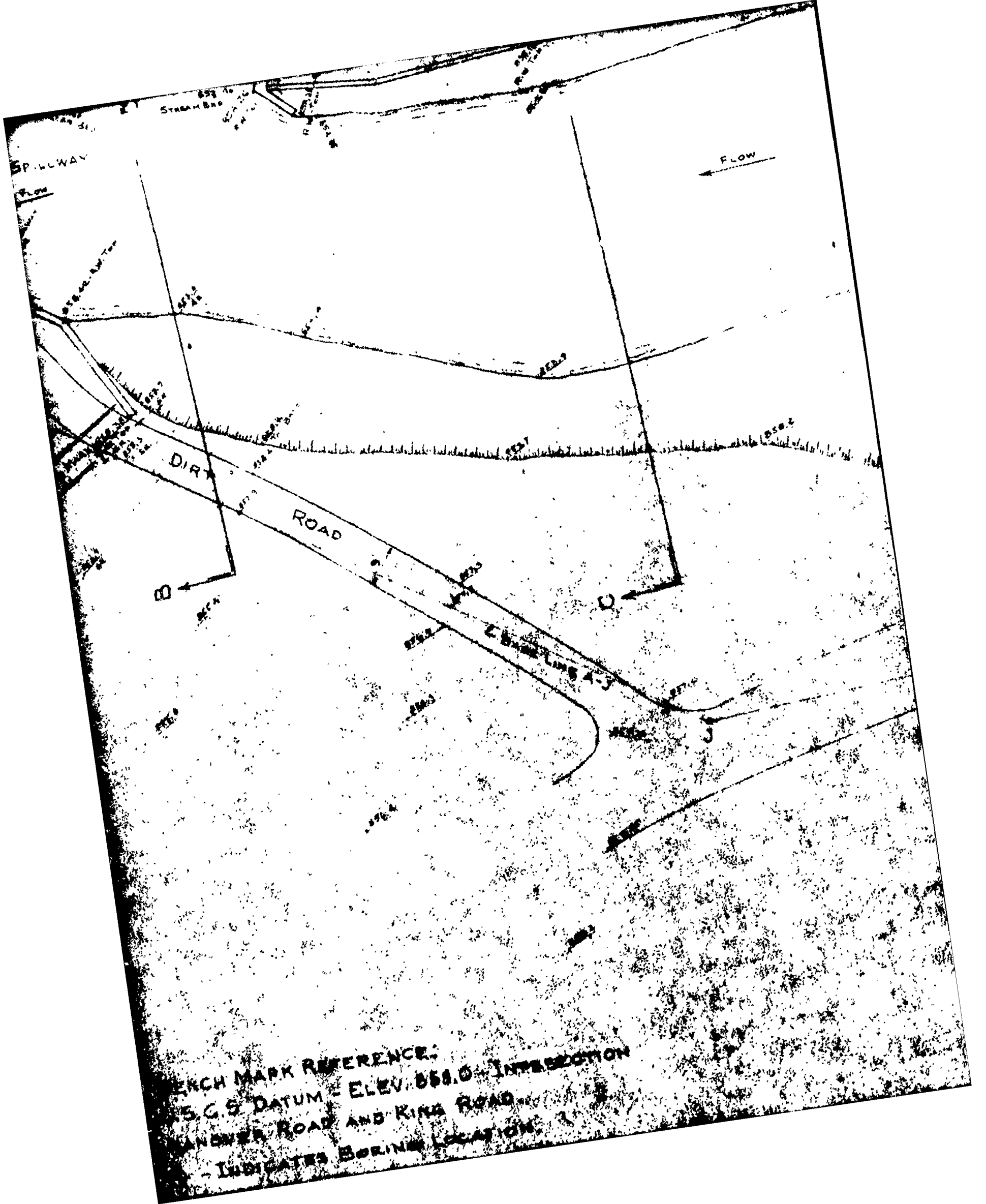
URBAN ENGINEERS, IN

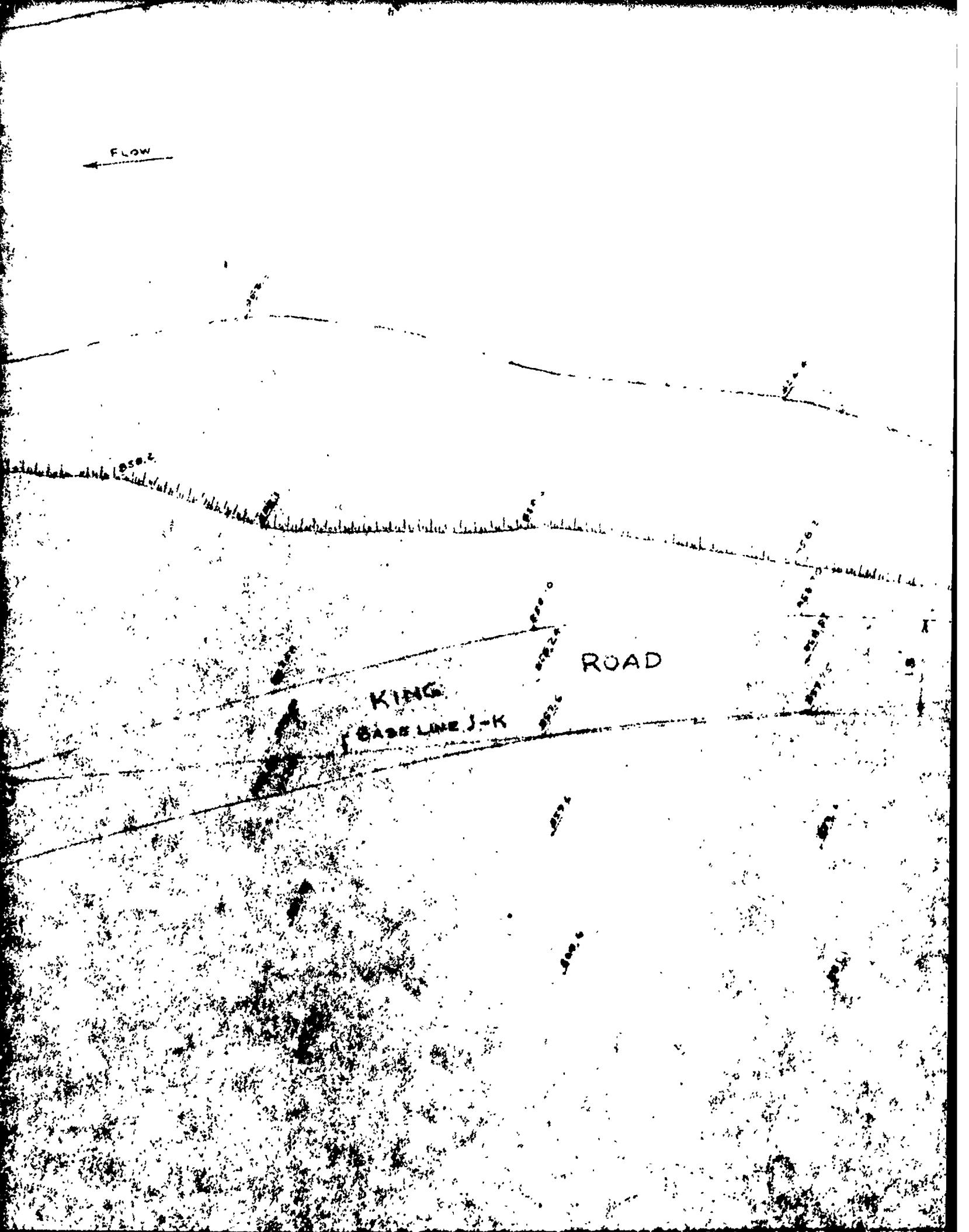


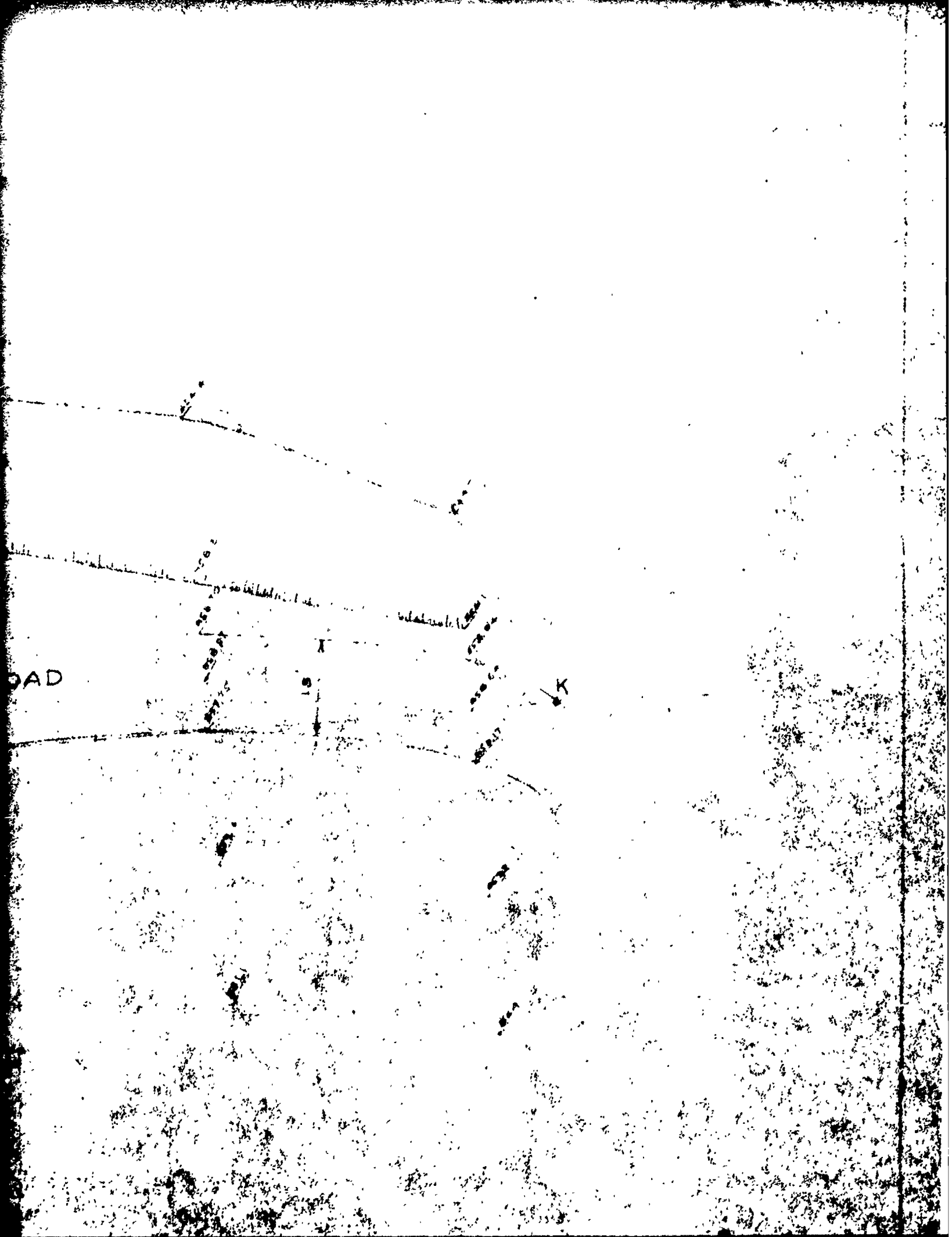
URVEY OF
RESERVOIR
TAUQUA COUNTY,
RK

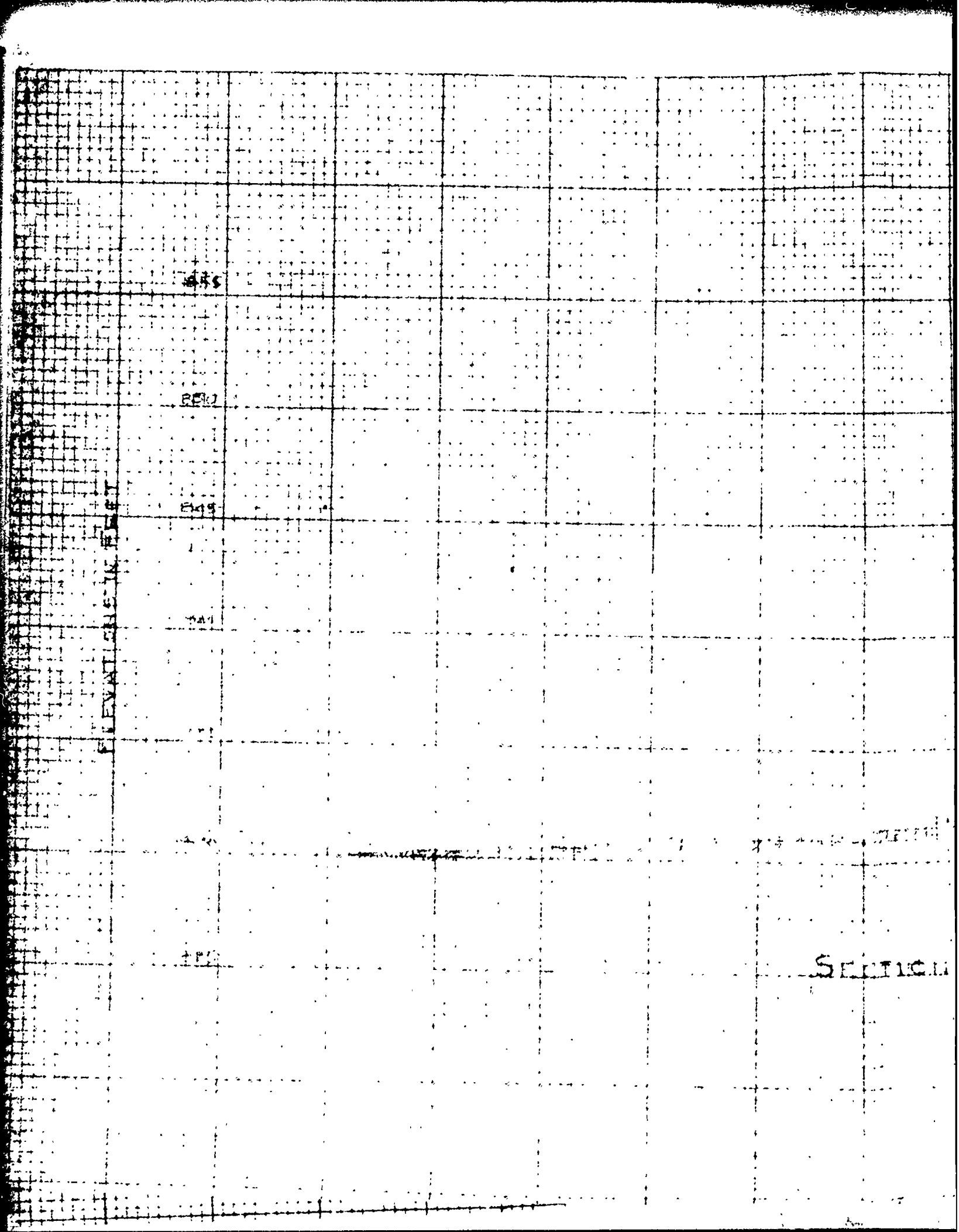
VEMBER 5, 1979.

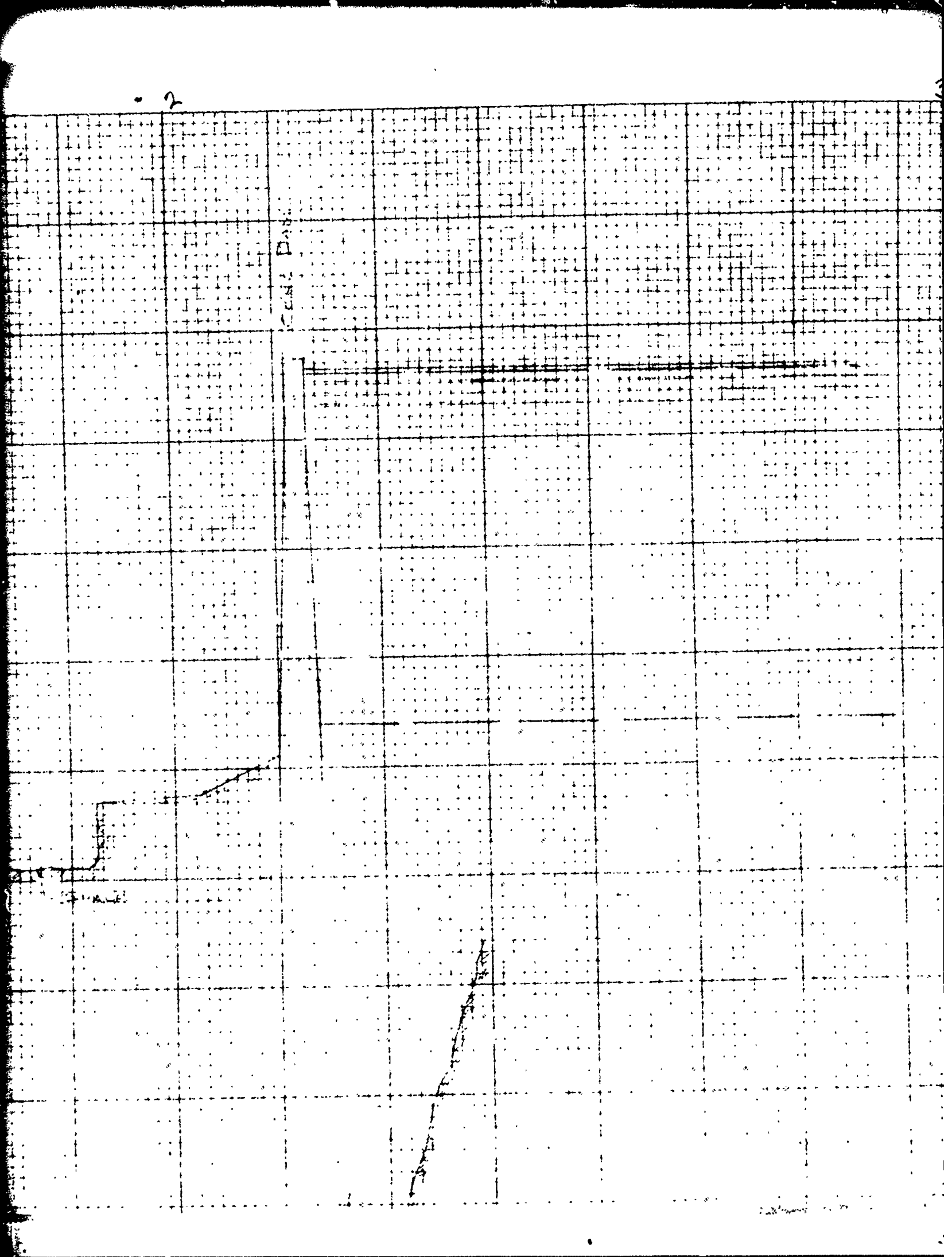
BENCH MARK
U.S.G.S. DATU
MANDVER ROA

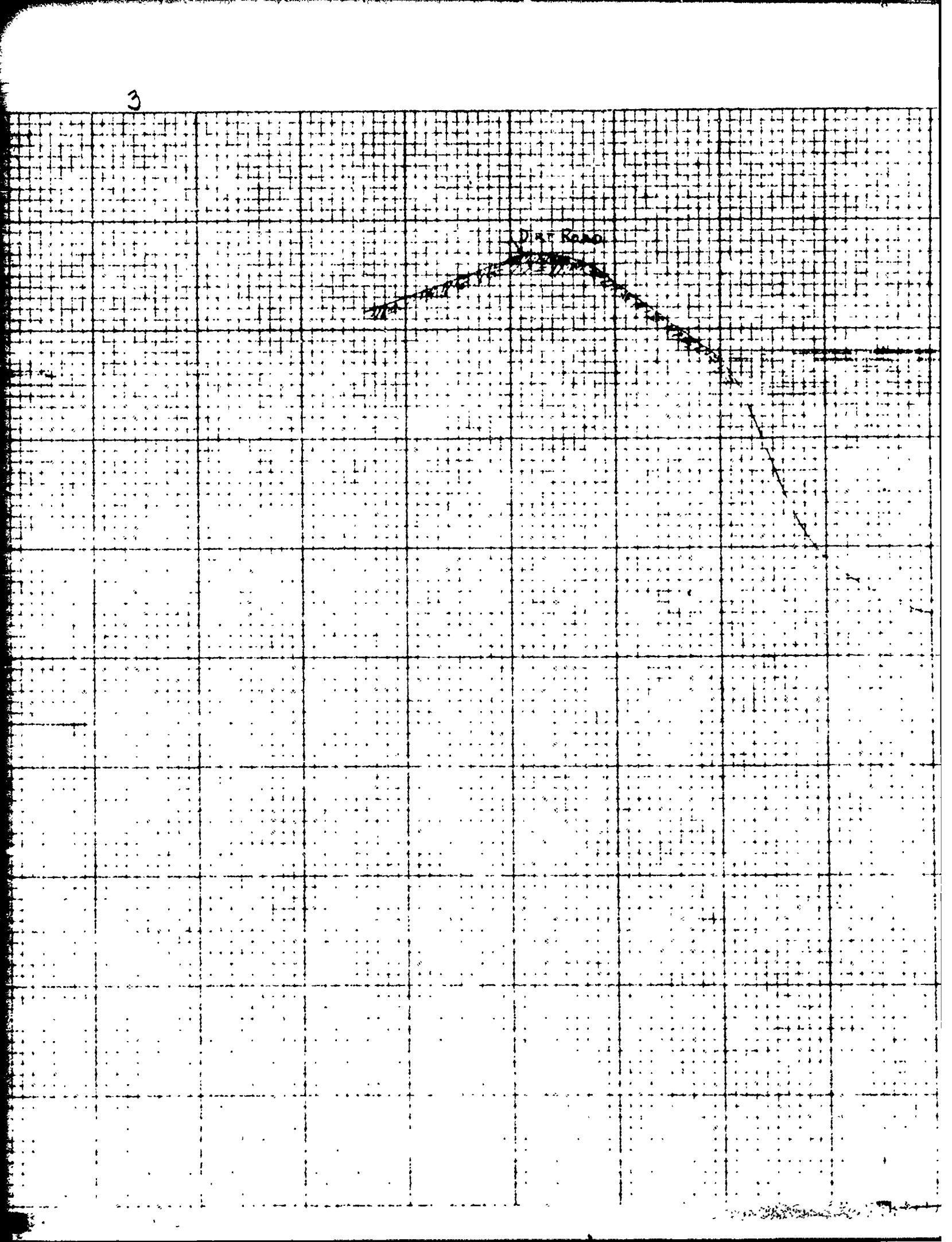

SPILLWAY
FLOW
FLOW
DIRT
ROAD
D
D
J
J
BENCH MARK REFERENCE:
U.S.G.S. DATUM - ELEV. 858.0 - INTERSECTION
ANDOVER ROAD AND KING ROAD.
- INDICATES BORING LOCATION.

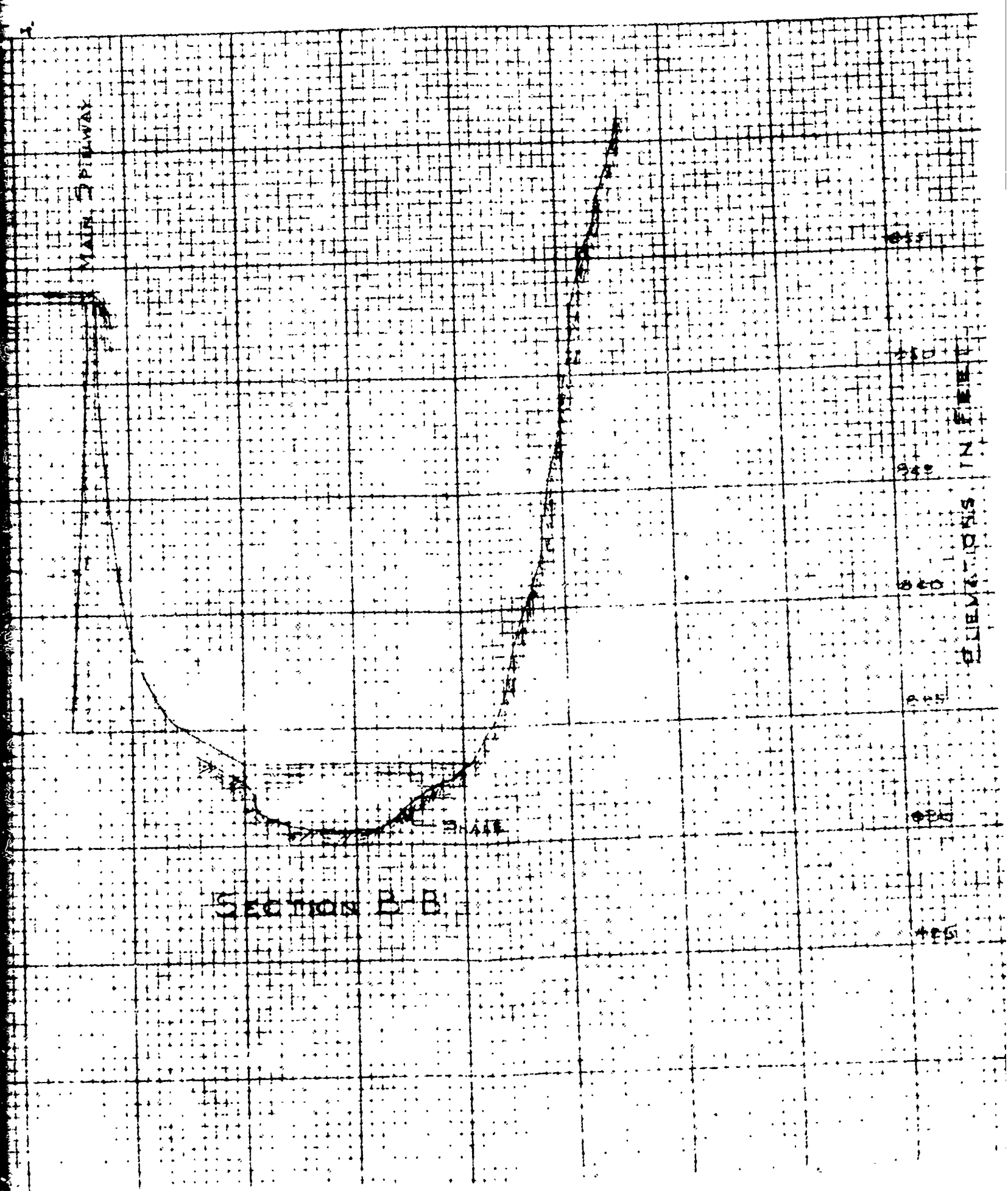

FLOW
ROAD
KING
BASE LINE J-K

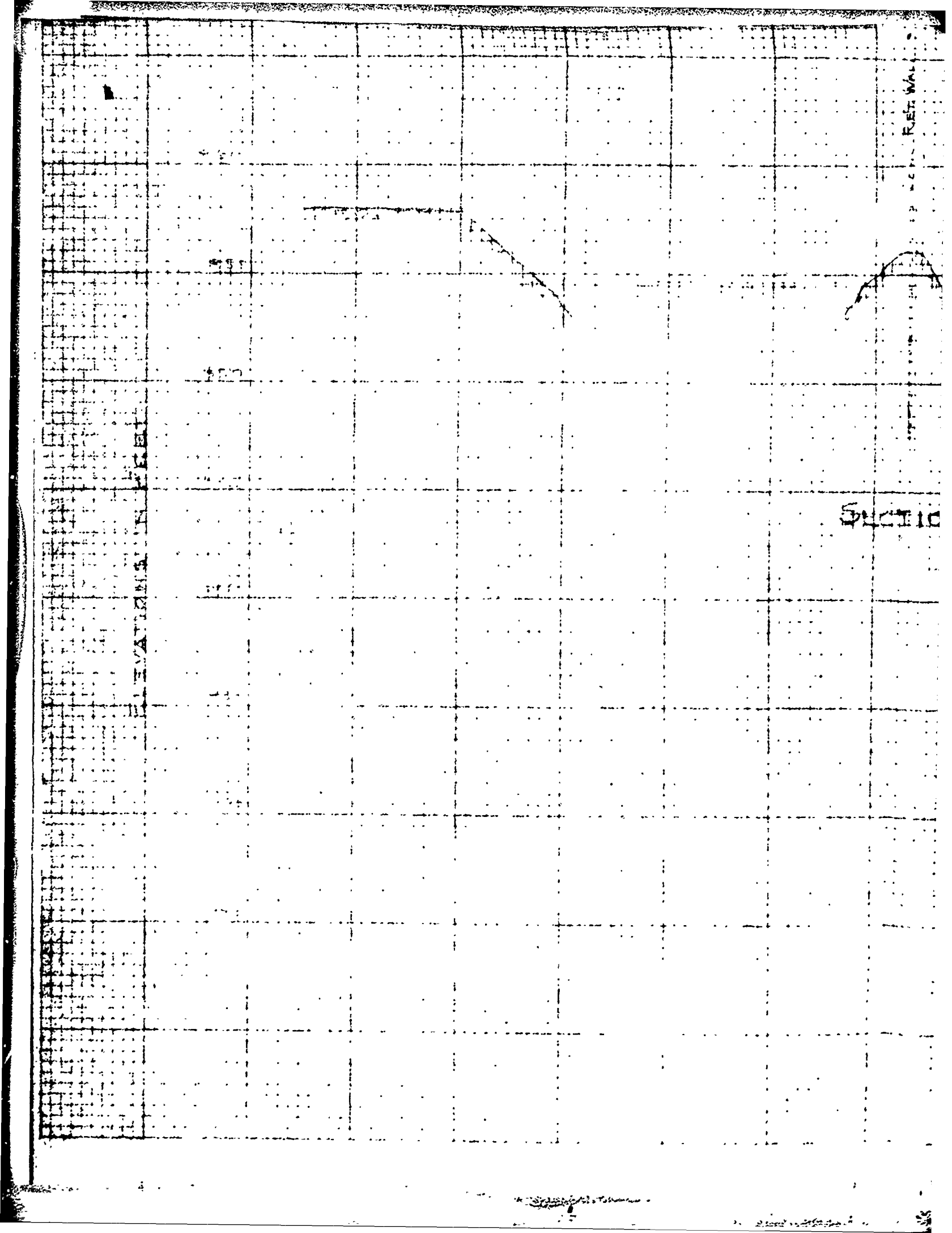

AD
K

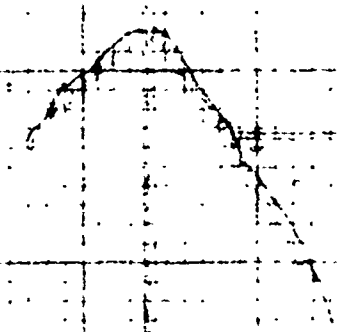

ELEVATION IN FEET
SECTION



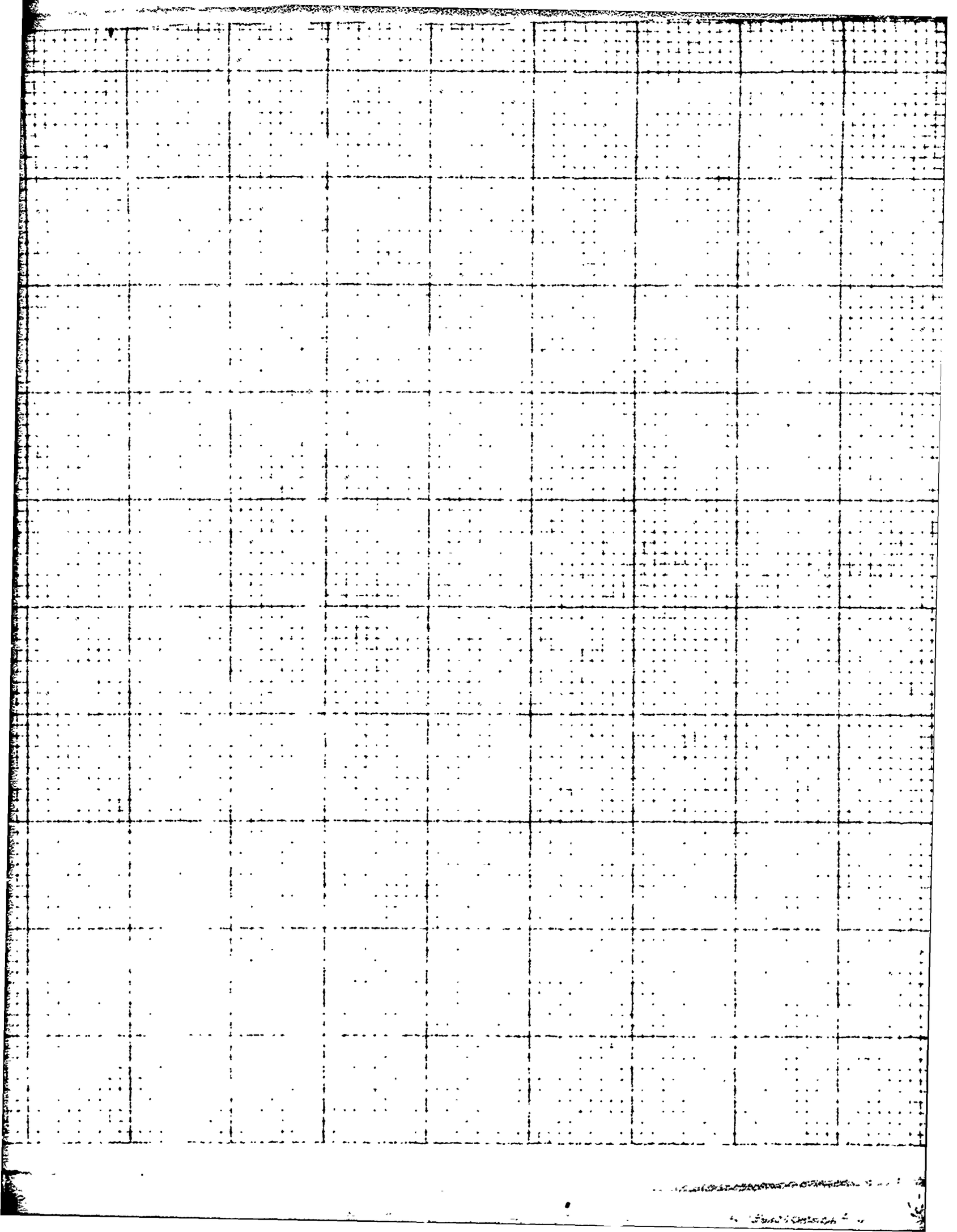

Dirt Road


MAIN SPILLWAY
SECTION B-B


RET WA
SECTIO



SECTION C



TOPOGRAPHIC SURVEY OF

SMITH MILLS RESERVOIR

HANOVER TWP., CHAUTAUQUA COUNTY

NEW YORK

SCALE: HORZ. 1" = 50'
VERT. 1" = 5'

NOVEMBER 9,

URBAN ENGINEERS, INC.

OGRAPHIC SURVEY OF

ITH MILLS RESERVOIR

R. TWP., CHAUTAUQUA COUNTY,

NEW YORK

NOVEMBER 5, 1978

URBAN ENGINEERS, INC.

SHEET 1 OF 2